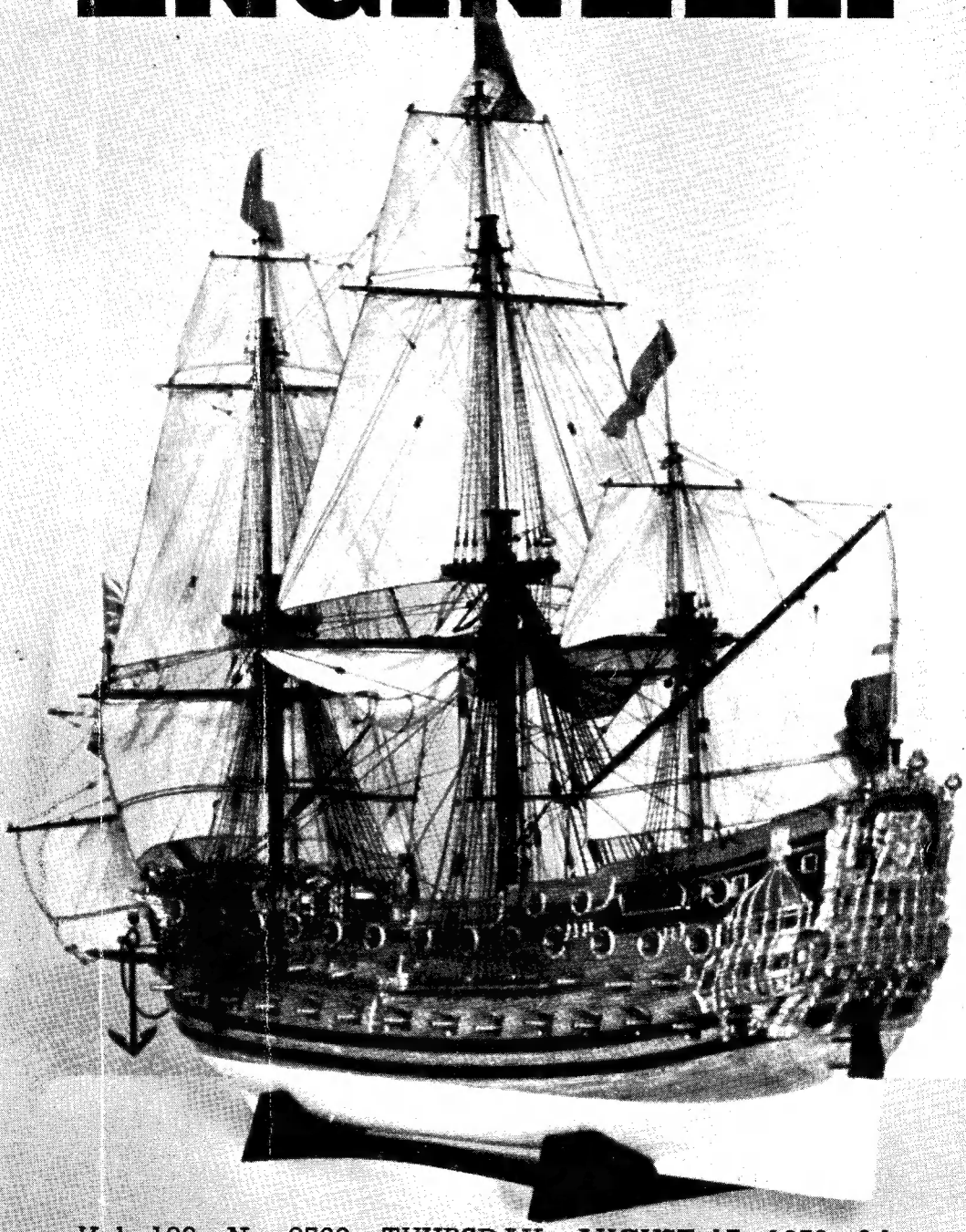
THE MODEL ENGINEER



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The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

17TH AUGUST 1950 VOL. 103 NO. 2569

SMOKE RINGS

Our 25th Exhibition

● A QUARTER of a century of "M.E." Exhibitions! This is surely a record of which not only *we* might be proud, but also the many thousands of our readers and model engineers throughout the world who have contributed, in one way or another, to make them possible.

Once again, as the doors opened, the hall was amply filled with examples of almost every known branch of our craft, and the many new attractions blended happily with their surroundings to make this, what we believe to be, one of our best shows ever. The competition stands have been returned this year to their popular position in the centre of the general layout, and as the exhibits are viewed, it becomes evident that the standard is of the very highest order. A point of particular merit is the exceptionally fine detail work which prevails, lending that degree of realism so essential to the character of a really first-class model.

Before passing on to the other exhibits, let us remember the judges, that gallant band of experts, all quietly pursuing their unenviable task of selecting the winning models in the various classes. Let us remember, too, that it is their task to select the model which not only *looks* right, but, in fact, the one that *is* right!

The loan section is once again well to the fore with a selection of most interesting models. A variety of subjects are portrayed, including those of historical and scientific interest, functional and static. Bearing in mind that the majority of these are the work of professional model makers, it is interesting to compare the quality of craftsmanship with that of some of the exhibits of a similar category in the competition section. It will not be uncomplimentary to either side to observe that the standards of achievement in both cases are possessed of equal merit.

In considering the new attractions, we must bear in mind the process of rapid expansion which is taking place. The fact that one is a model engineer should not suppress the development of further kindred interests, and it is the realisation of this important factor that has led to their inclusion. Working on the assumption that all model engineers are, to a greater or lesser degree, home craftsmen, we feel sure that our readers will agree that these additions are more than justifying their presence.

As in previous years, the trade is well represented. The quality and variety of the goods on display have advanced in keeping with present-day development in other spheres of industry,

thus proving that the model engineering cult is ever popular, ever expanding, both in scope and in numbers.

On looking around, there can be no doubt that ours is surely the world's most popular and intriguing hobby!

Our Cover Picture

● THE SUBJECT this week is probably one of the finest models in this year's "M.E." Exhibition. It is very unlikely that there are other models of whatever class which are at once more accurate, more detailed or more completely satisfying. The model represents H.M.S. *Prince* which was built in 1670 at a very interesting period in the development of the ship, and a period, moreover, when the decoration of the ship was at its most sumptious and magnificent. This particular model is the work of Rear-Admiral Blackman, D.S.O., of Ashton, Hants, whose beautiful model of the Elizabethan warship won the Bacon Cup in our 1934 Exhibition. Its successor is a worthy addition to the series of ship models he is building to illustrate the evolution of the rigging of the sailing ship. The sails of this model are worthy of note. They are beautifully made, and, owing to the delicacy and suitability of the material, they hang very naturally and add greatly to the appearance of the model. So often the addition of sails spoils a model, but in this instance the reverse is the case. This is not a large model, the scale being only $\frac{1}{8}$ in. to 1 ft., but everything is so nicely proportioned both in the hull details and the spars and rigging, that it is almost impossible to say from the photograph what is its actual size. One certainly gets the impression of a large scale model.

An "M.E." Tie?

● AN INTERESTING suggestion has been sent in by a reader, Mr. A. Macartney, who writes: "From time to time, we read in THE MODEL ENGINEER of instances where model engineers have become known, one to the other, by chance. For example, a friend of mine became a valuable and active member of an English society because he was seen to be reading a copy of THE MODEL ENGINEER in a tramcar. A random remark of mine at a garage in the north of Scotland discovered that the proprietor was an enthusiast in model petrol engine construction. I am sure that we all have had instances of this nature in our experience.

"Now would it not be more satisfactory, instead of relying on blind chance, for us to wear some unobtrusive evidence of our interest in our activity? I admit that on special occasions, such as the 'M.E.' Exhibition, track opening functions etc., a badge is in order; but the constant wearing of a badge in the course of one's daily duties is not so attractive.

"We can ignore the fact that, in certain circles, the school or club tie has become a subject for derisive comment, and in charity will not attempt an investigation into the psychological processes which give rise to this state of affairs.

"Would it not be possible for one of your artistic staff to design a pleasant tie, say navy blue poplin or silk, with a discreet pattern of crossed dividers and a micrometer, or a symbolic lathe (!), and market it for THE MODEL ENGINEER? I feel there are sufficient prospective purchasers of such an article to justify its production."

This is an idea which we pass on to our readers, and we would like to know what they think about it. We would add, however, that we produced an "M.E." badge many years ago, and our experience with it fully confirms Mr. Macartney's comments on badges. It sold in fair numbers, but not enough to make it a commercial success.

A tie is a different proposition; it would be much more expensive to produce, but it might meet with wide approval and so justify itself. The main factor is whether sufficient readers would be interested in the idea; if not, they must have some potent objections to it, and we would like to know what those objections are before we can come to a decision as to whether the idea is worth proceeding with any further.

Locomotive Driving Certificates

● WE HAVE received some specimen copies of the official documents to be used by the S.M.E.E. Affiliation in its scheme of issuing certificates to all who aspire to becoming recognised as capable and trustworthy drivers of small locomotives. We have already referred to this scheme more than once, but we feel that it is so important a matter that too much attention can hardly be given to it.

First, there is a "Notice to Applicant for a Certificate"; this is in the form of a leaflet which, on being signed by the applicant, establishes a clear understanding between him and the Testing Committee.

The second is a "Tester's Report" to be filled in and signed by two members of the committee.

The third is a formal letter advising the applicant of the committee's decision to award him a certificate and requesting his co-operation in maintaining its value in the future.

The fourth is the certificate itself, a neat, printed, folded card which can easily be carried in the wallet or vest-pocket. It has spaces for the signatures of the holder, the tester and the Chairman of the Testing Committee.

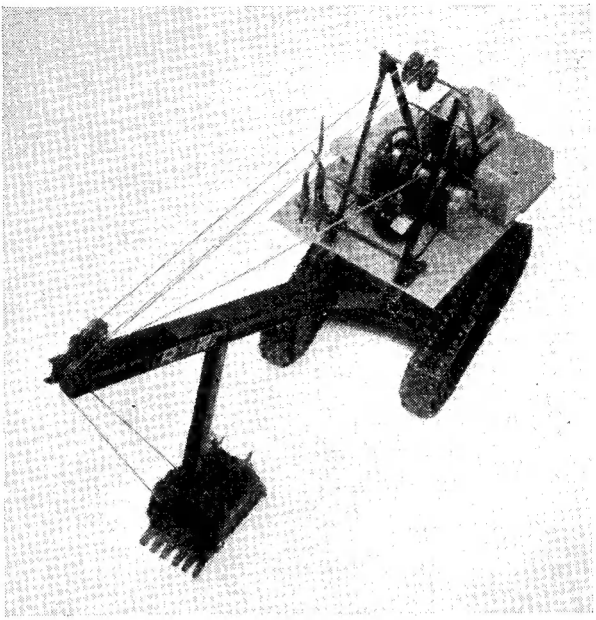
We feel that, in instituting this scheme, the S.M.E.E. Affiliation is doing much to safeguard passengers on miniature railways by ensuring that the drivers in charge of the locomotives are fully competent to drive without risk to the public. With the very rapid increase in the number of miniature railways on which the passengers are drawn from the general public, some such method of avoiding unnecessary risks was due, and the Affiliation is to be congratulated upon taking the initiative in the matter.

Finally, we feel sure that all to whom certificates are eventually issued will do their utmost to propagate the wisdom of the scheme. After all, there is nothing particularly new in the idea, because most owners of public-carrying miniature railways have hitherto held the right to refuse permission to drive the engines, in the case of an unknown and untried applicant. As our contributor "1121" has wittily shown, recently, an inexperienced or careless driver can be a source of keen anxiety, if not of actual danger.

Exhibition Models at Random

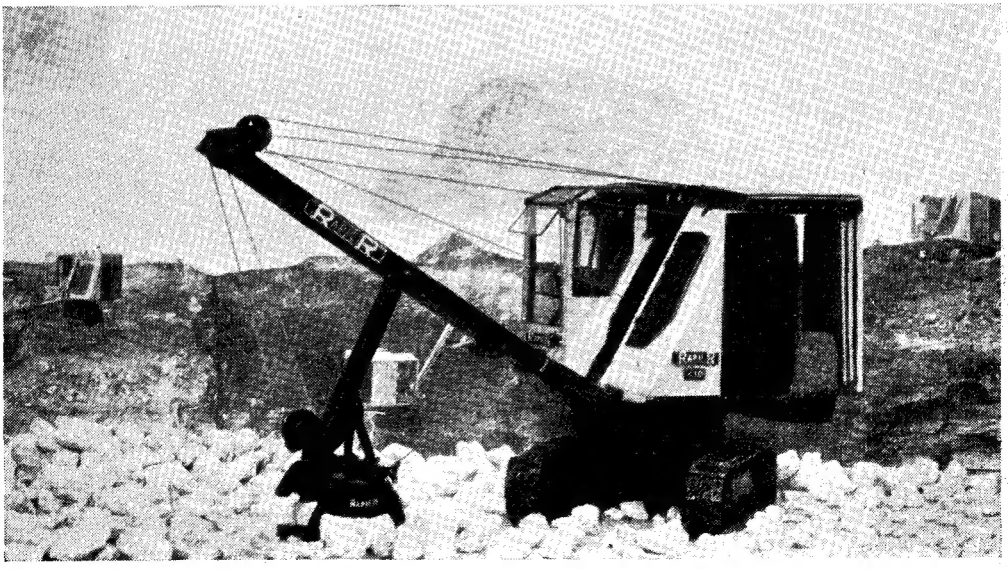
THOSE of our readers who are unfortunate in not being able to attend this year's "M.E." Exhibition will be longing, no doubt, to see illustrations and read something about some of the entries. Here, then, as an appetiser, is a brief resume of a few models picked at random:

Weighing approximately 60 lb. for a length of 4ft., a width of 2 ft. 6 in. and a height of 2 ft. the excellent 1 in. to 1 ft. working scale model Rapier 410 excavator by Mr. Raymond A. Rush attracts favourable attention. It took upwards of 1,200 hours to construct, spread over three years, the track links, of which there are 60, taking over an hour *each*! All the castings were done by Mr. Rush.

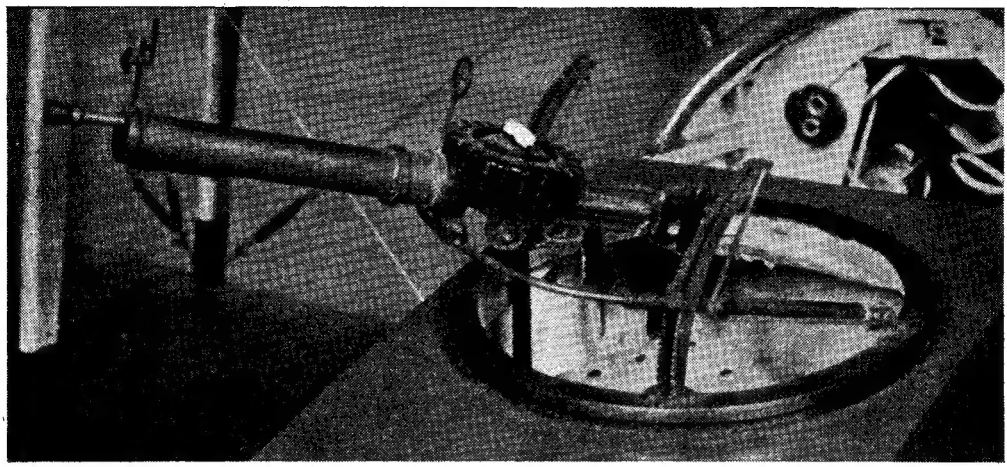


The Rapier excavator with the cab removed to show scale machinery

Vintage aircraft are a constant source of interest, especially those of the 1914-18 war era. This is amply borne out by the large number of flying scale models of this type that are being built at present, and the exhibit of Mr. Edward J. Pithers shows what can be done with his typical example of a Type F2B Bristol Fighter. The model is a fair size, with a span of 4 ft. 8 in. and is powered with a 10-c.c. engine. All

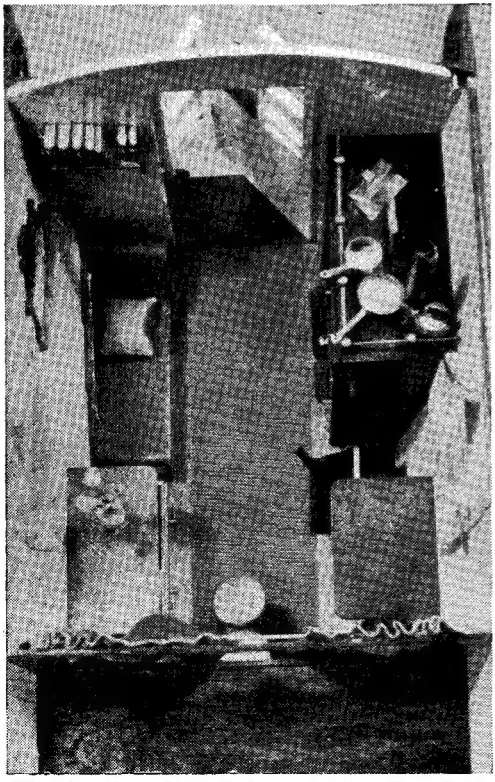


The Rapier 410 excavator by Raymond A. Rush



The scale Lewis gun and mounting on E. J. Pithers's Bristol fighter

the usual control surfaces are operable from the cockpit. Reference to the photograph reproduced herewith will give some idea of the close attention to detail which has been a feature in the construction of this model.



The interior of a gypsy caravan by F. J. Pateman

An intriguing model which must have called for great patience and very fine workmanship in producing the miniature furnishings and cooking equipment is the gypsy caravan by Mr. F. J. Pateman, a member of the Cambridge and District Model Engineering Society. The scale is 1/12th approximately, dimensions being: length, 1 ft. 8 in.; height, 11 in.; breadth, 7 in. There is, of course, no horse! The undercarriage is correct to type and incorporates working brake control.

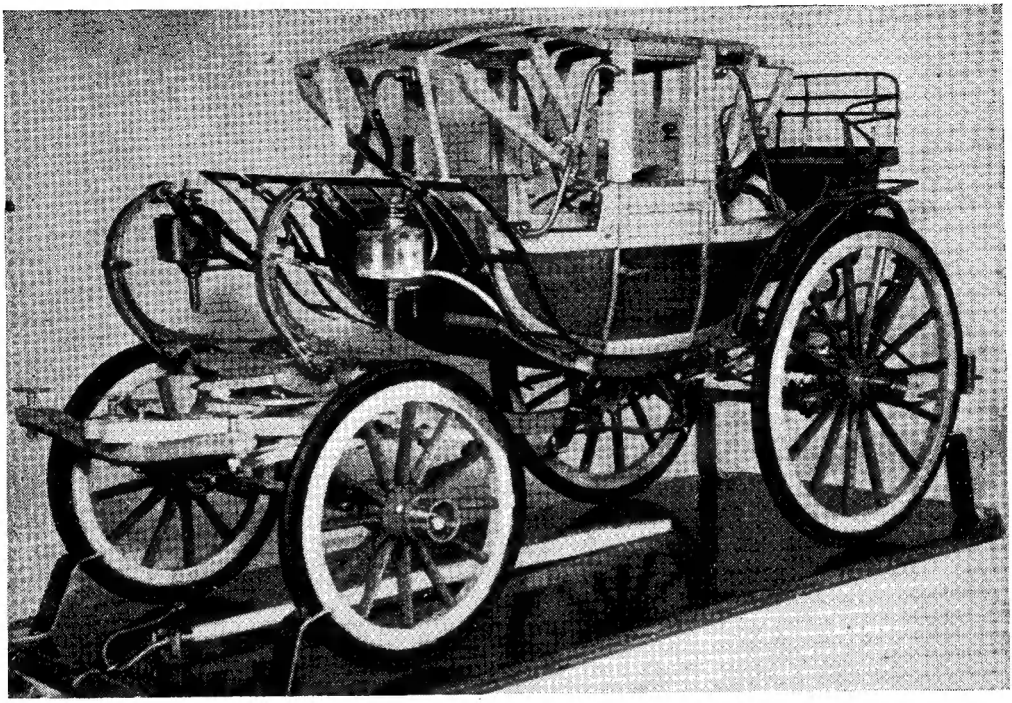
Another vehicle which should be of considerable general interest is a scale model of the state landau built by Messrs. Hooper for H.R.H. The Prince Regent of Iraq in 1948. It is the work of Mr. P. Winton of the Harrow and Wembley, and Handley Page Societies of Model Engineers. The illustration speaks for itself.

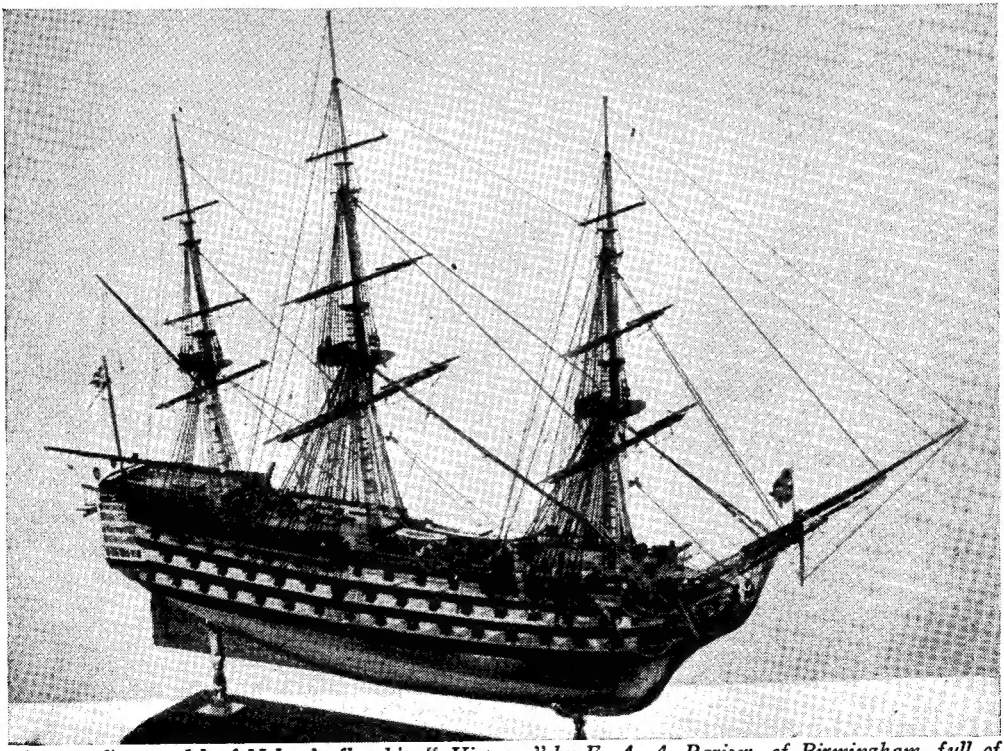
In the marine section this year there are some exquisite examples of the ship modeller's art and what better model could we pick for illustration than the fine one illustrated. Nelson's flagship *Victory* by Mr. F. A. A. Pariser, of Birmingham. It requires but brief scrutiny to appreciate the very intricate work involved in the rigging of such a model, and it will be seen, too, that the detail work is particularly good.

For those who prefer something modern and functional, the work of Mr. Robert S. Anderson, of Willington-on-Tyne in the form of a 6 ft. version of the Portuguese motor ship *Angola* should prove interesting. Here again, some very good detail has been incorporated, and apart from just looking good, the model should give a nice performance in its natural element.

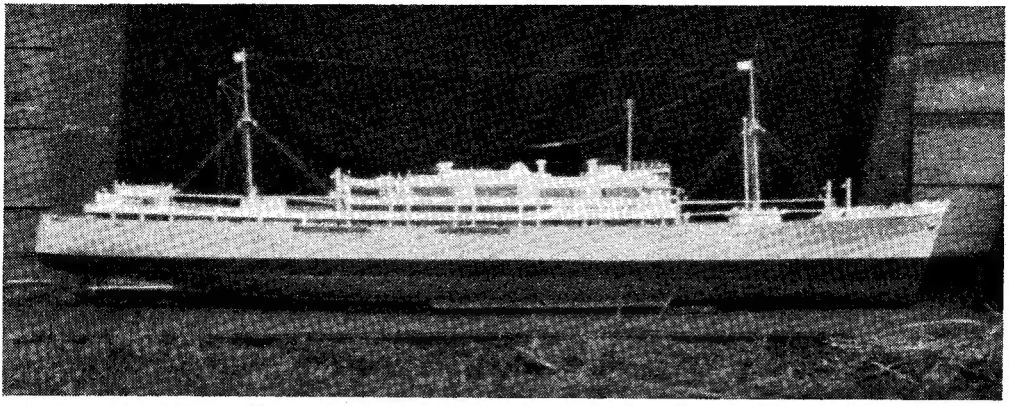
Finally, readers interested in steam boats will find *Musetta* a worthy example. She is built on the lines of a modern cruising yacht, and is powered by twin steam engines. Built by Mr. A. Wrench, of Weybridge, she measures 4 ft. 6 in. long and her hull is constructed of metal.

The Ship Modelling Section is as strong as ever, a fact which may be attributable to our reputation as a seafaring nation.





A very fine model of Nelson's flagship " Victory " by F. A. A. Pariser, of Birmingham, full of interesting and careful detail

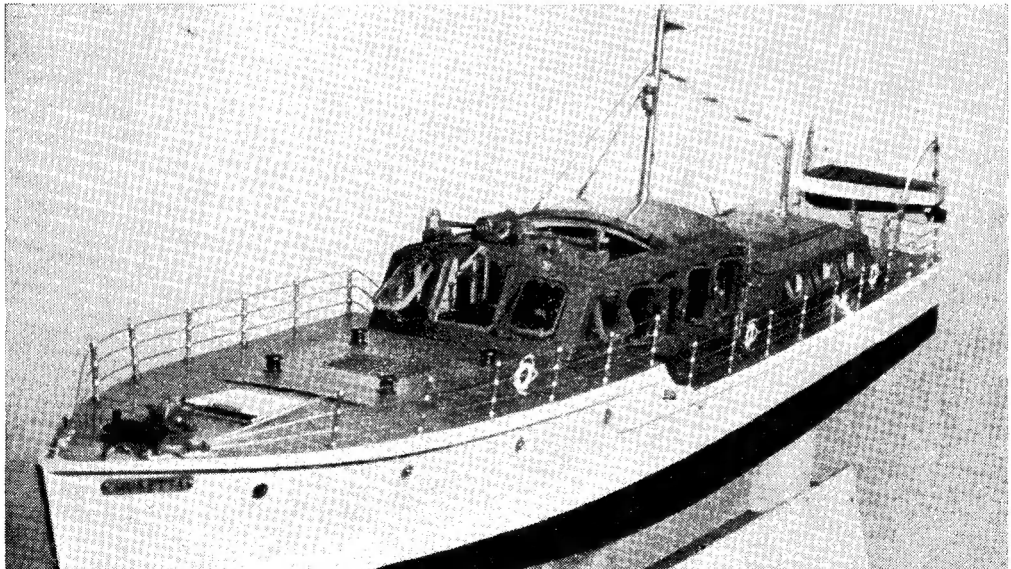


An impressive 6 ft. working model of the Portuguese M.S. "Angola" made by Robt. S. Anderson of Willington-on-Tyne

The Locomotive Section is well represented, and the many outstanding exhibits in this field are a tribute to the skill and patience of their constructors.

It is sincerely hoped that in this little survey you will have found something of interest to you. Should anyone feel that his particular department has been neglected, we ask you to bide your time; you will not be disappointed!

Space will not permit more at the moment, but we hope to give readers another look at some of the outstanding models in future issues of THE MODEL ENGINEER. Our photographers are hard at work in your interests, and you may rest assured that the results will be well worth waiting for.

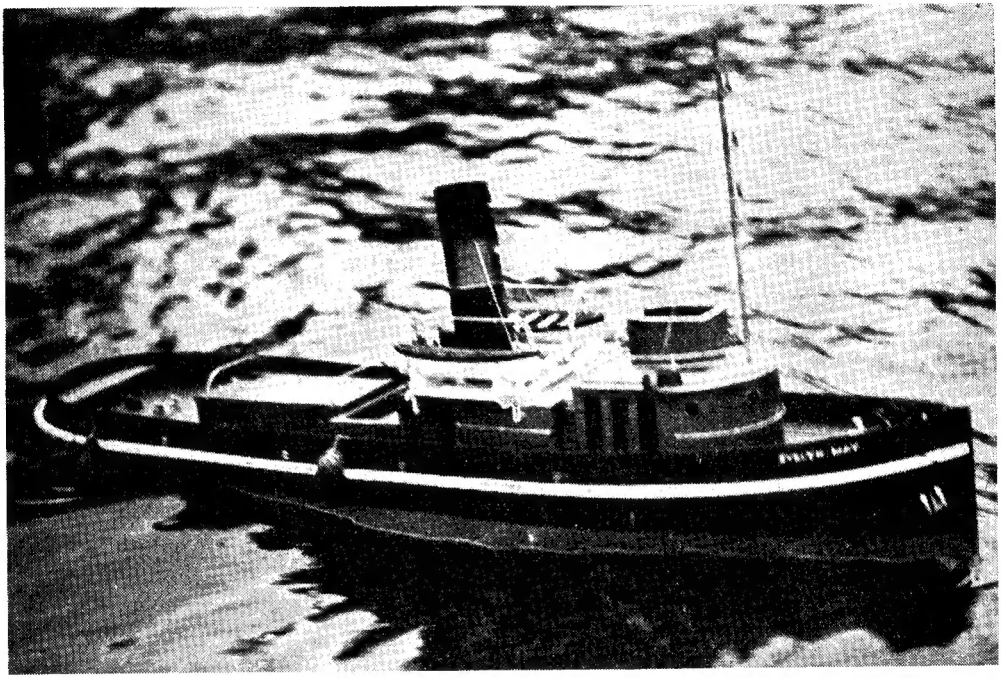


A model cabin cruiser 4 ft. 6 in. long with metal hull and twin steam engines entered by A. Wrench, of Weybridge, Surrey

The "EVELYN MAY"

A 3 ft. 6 in. Coal-fired Steam Tug

by F. W. Thomas



THE question of coal-firing for model steam ships was mentioned some months ago in articles by Mr. Westbury and "L.B.S.C.", so perhaps a description of my coal-fired tug would be of interest to other readers.

As an interested steam boat fan for a number of years I have always wanted to try out something like this, so that when I started building the *Evelyn May* from "Spectator's" splendid description and drawings of the *Gondia*, I was determined to have a go at a coal-fired boiler.

Having perused all my back numbers of THE MODEL ENGINEER as far back as Vol. 62 and finding no description of any boiler being used for a steamer plant, except one by an Australian reader who did not include any drawing, I was rather at a loss to determine what sort to use. I finally came across a drawing of a vertical Sentinel type boiler which had given its builder every satisfaction in his model road wagon (December 20th, 1937), and since simplicity was the keynote of its construction, this seemed the very thing to experiment with.

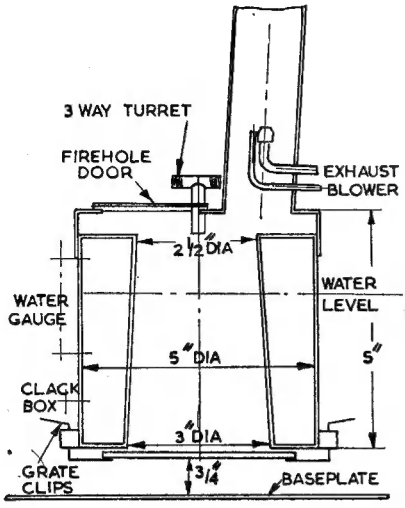
As you will see from the drawing, it consists of an outer shell with an inner coned firebox joined at the top and bottom by two rings. The smokebox is made in the form of a lid fitting over the top of the boiler; in this are cut the openings for the uptake and the firehole.

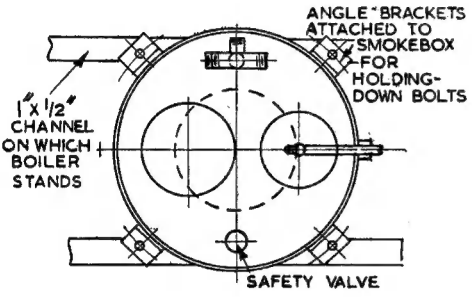
This was constructed of steel, 18-gauge for the shell and firebox, and 15-gauge for the top and bottom rings, the whole lot, together with the smokebox lid was welded up through the services of two friends, one of whom also made me a very good set of firebars from $\frac{1}{8}$-in. square cast-iron rod.

This grate is held into position by two clips working in lugs which are brazed to the bottom edge of the shell.

The boiler is fitted with an "L.B.S.C." pattern water gauge and clackbox, the steam being taken from a three-way turret screwed into the top ring through a hole in the smokebox lid; one side supplies steam to the engine via a screw-down valve, the other two being used for blower and pressure gauges.

Water is supplied by one of "L.B.S.C.'s" two-hour pattern hand pumps of $\frac{1}{2}$ in. bore. The original boiler was fitted with a superheat coil in the top part of the firebox, but I have not found it necessary to fit one, since the steam seems quite hot enough for the $\frac{5}{8}$-in. $\times$ $\frac{5}{8}$-in. d.a.s.v.





engine which it drives. This boiler has been in use now for nearly two years and has been very successful. It will burn almost any sort of coal; in fact, I use the ordinary " best house," since plenty of smoke is quite in order for a model tug. To start up, a bicycle pump is connected up to the exhaust to supply some draught, some slivers of wood soaked in oil are put into the firebox and a fire gradually built up with more wood and small pieces of coal. Once steam is up, the blower takes over for a while until the fire is well alight and then the exhaust from the engine is enough to keep the fire going while the boat is running, and so long as you keep an eye on the fire and the water gauge, there is no limit to the length of time which you can keep going. It is often in steam for as long as three hours at a stretch at our monthly club meetings.

There is no doubt that coal-firing is an added interest to model steamer running, for not only does the real smoke add to realism, but, as other members tell me, she not only looks like a tug but " smells like one, too " !

The rest of the boat follows usual practice, the hull being built of tinplate, but not to *Gondia's* lines, although the deckwork was faithfully copied from *Gondia's* drawings. The engine, as stated, is a $\frac{5}{8}$-in. × $\frac{5}{8}$-in. d.a.s.v. built up, mainly from scrap, to an " M.E." design first published some years ago and since included in Mr. Westbury's " Utility Steam Engines " article (see February 10th, 1949) ; this drives a three-bladed propeller of 3 in. dia.

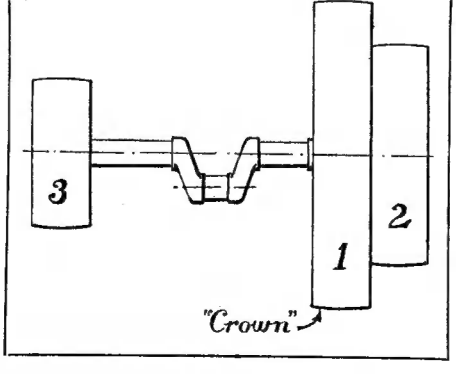
The three masthead lamps, as well as the port and starboard lights, work from a 3-volt battery situated under the bridge, this whole section, i.e., bridge, engine room casing, being made to lift off in order to get at the boiler and engine.

In conclusion, I must say that I have been highly pleased with the performance of this boiler and I can recommend it to anyone who would like to have a go at coal-firing.

Pulleys on Crankshafts of Engines

MR. RONALD H. CLARK, remarks in the article in the October 13th, 1949, issue of THE MODEL ENGINEER, describing the traction engine by W. Tuxford & Sons, built in 1876, that " it is unusual to find an extra pulley mounted on the flywheel spokes, but possibly this was a later fitting."

Now the writer has seen a photograph of a very large " portable " engine used in the U.S.A. which had two pulleys, in addition to the flywheel (made wide enough for a belt), so that three belt speeds are available for one speed of the crankshaft, as shown in the diagram, and this is a great advantage at times.



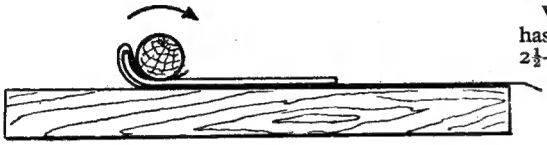
If the circumference of the large wheel is about 20 ft., and the others, respectively, 15 ft. and 10 ft., one has a very useful range ; the sizes of the wheel can, however, be easily calculated for any particular case, and this applies to any general-purpose engine, whether steam, petrol or oil driven, and it would have been an easy matter for the traction engine illustrated to have been thus equipped when first constructed.—H. H. NICHOLLS.

Transparent Plastics—Tubing

by W. D. Arnot

MR. P. W. BLANDFORD has given some useful hints in the April 27th issue of THE MODEL ENGINEER on the turning of plastics. Another aspect that confronts the experimenter is how to prepare transparent tubing in plastics.

Some time ago, the writer was seeking to produce a mechanism, the action of which he wanted to be able to watch throughout its function and he was determined to make the job in Perspex. It was found that clear tubing such as would be required was obtainable commercially up to 4 in. or 5 in. diameter, but it is very costly even



Curling Perspex tube

in small amounts and the material is not perfectly circular or of uniform wall thickness, because it is rolled from the sheet, ground at the joint, and cemented or welded.

A few hints on doing the job yourself may be of interest, for I have found I can do as well as the commercial job for moderate lengths.

The material has to be worked very hot; between 212 and 250 deg. F. is the temperature, and that demands the use of cotton gloves. This makes manipulation difficult.

Making Small Tubes

To make small diameter tube, get the thinnest sheet, about $\frac{1}{16}$ in. thick, and cut the required length and width rather more than the circumference of the required tube. There is a slight shrinkage in heating, scarcely noticeable for small tube but significant for larger diameters and wall thicknesses.

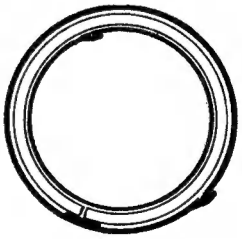
Lay the cut sheet on an asbestos mat in the oven, but do not use fluffy asbestos, since this may adhere. Better still is to suspend the sheet by clothes pegs in the hot oven, but longer heating will be needed. If there is no means of measuring the temperature, let some portion of the sheet touch hot metal, and as soon as the temperature is going too high, the sheet will emit a slight crackle where it is touching the metal, a sign of overheating and the forming of bubbles in it.

At correct temperature, and this depends on thickness within the range of heat shown, the sheet is quite limp and rubbery, being awkward to handle, so act with speed. Whip it out of the oven on to a sheet of heavy brown paper on a wooden board to preserve the heat. Take a wooden dowel the size of the required bore, which has been polished smooth; fold the edge of the brown paper over the edge of the plastic to be curled and trap the end with the dowel. Roll rapidly as if rolling pastry, winding the paper in and several times round outside the tube. Allow plenty of time to cool. In cooling, the material will take an inward spring and grip the paper rolled in the joint. Work this out and the joint will close. Run " Diakon " cement down this joint and allow it to set. The joint can then be trimmed and polished, and, if well formed, will show a fine line only.

Allow for Shrinkage

When a large-diameter tube in thick material has to be dealt with, allow for shrinkage. A $2\frac{1}{2}$-in. inside diameter tube in $\frac{3}{16}$ in. Perspex will require the width of the sheet to be cut some $\frac{3}{16}$ in. more than the calculated circumference of the mean diameter. In thick material it is difficult to get the joint edges to follow the circle, and they tend to pull to a vee gap joint; the edges can be cut to counteract this.

One successful way to get the joint to close completely is to form round a tin that fits the bore, then slide into a tin fitting the outside diameter. The clearance needed to do this fitting will still let the gap edges straighten out, so thrust a strip of wood or pre-heated metal down the outside of the joint to hold the edges in until set. The material is still soft, so work with care not to ruffle it. The work can be done with less hurry if the inner tin is smaller than required and brought up to required diameter by wrapping and gluing on stout brown paper; this preserves the heat. The same applies to the outer tin.



Closing joint in thick-walled tube

Flairing pipe joints

If tubes have to be coupled or attached to other members, jointing is easier if the end is flared or coned, like a funnel. To cone them, heat the end only a short way, insert a pointed dowel or wooden knitting needle and rock this round conically while the end is cooling. The end soon sets to the required shape.

PETROL ENGINE TOPICS

*A 10 c.c. Twin Four-Stroke

by Edgar T. Westbury

THE main machining operations on the cylinder barrels are simple and straightforward, but demand care in view of the importance of the accuracy of these components. Cylinder castings of small engines are often distorted in the course of machining by the pressure of the chuck jaws on the relatively thin barrels, but this trouble can be prevented if due precautions are taken. The method recommended in this particular case is to machine the top joint face first, and then use this as ■ clamping face to mount the casting on the faceplate for dealing with the bore and lower end face. For the first operation, the casting may be held by the base flange in the four-jaw chuck, and exact centring is unnecessary, but the sides of the casting should be square with the chuck body. The top face should not be machined to final dimensions, as it will be advisable to leave a little for finishing when the cylinder liner and valve seatings are in position.

When mounting the cylinders on the faceplate, toe-clamps may be used, bearing on the shoulders of the water jacket on each side; in this case also, a sheet of paper under the clamping face is advised. The inner surface should be finished as accurately as possible, and preferably dead parallel, though a very slight taper (smaller at the bottom than the top) is permissible, if the liner is made to correspond, as this will simplify fitting. At the same setting, the bore of the water jacket is machined, and the bottom face finished to produce ■ flange thickness of $\frac{1}{8}$ in. or slightly more. It is permissible to take a skim over the top of the flange, as an alternative to the more correct procedure of spot-facing the top surface of the bolt holes only. The recess at the top of the bore, for locating the lip of the liner, should be machined by mounting the casting on ■ stub mandrel.

Valve Seating Bores

These should be machined by mounting the casting on the faceplate, using a single bolt through the bore, with a plate or large thick washer on the top surface, and paper interposed at each face. Do not attempt to drill these holes in the drilling machine, or by equivalent methods, ■■ both the accuracy and finish of the bores produced in this way are open to question. The position of the holes should be marked out by reference to the cylinder bore centre, and a very good method of ensuring accuracy in this respect is to do the marking out in the lathe, with the work mounted on the stub mandrel. First set the valve port face uppermost, using a square on the lathe bed to check up the sides of the water jacket and the base flange. Then with ■ scribing block on the bed or cross-slide, having the scriber point previously set exactly to centre height, scribe ■ cross line on the top cylinder face. Turn the mandrel 90 deg., using the square to sight against the cross line, and scribe another centre line on the face; then turn it back to the first position, and readjust the scriber to $\frac{3}{4}$ in. higher than the lathe centres and scribe a centre line for the seatings, which are then marked out by dividers, 7/32 in. on either side of the cylinder centre. These operations, it may be observed, can be considerably simplified if the lathe mandrel is equipped with some form of indexing gear.

Set up each of the seating centres in turn to run as truly as possible, then centre-drill deeply and drill right through, 19/64 in. diameter, following up with a light skim with a fine boring tool to within about 0.005 in. of finished size, and also machining the recess to $\frac{3}{8}$ in. diameter by $\frac{1}{16}$ in. deep. A reamer is then used to finish the bore, and if there is the least tendency of the metal to drag, it should be lubricated with soluble oil and the reamer frequently backed out to clear the chips. If no reamer is available, the hole may be carefully finished with the boring tool, or lapped out with a copper lap and fine abrasive paste.

The cylinder casting may now be set up on an angle-plate, using the bolt through the centre as before, and the valve port face machined; after carrying out this operation, the ports may be drilled into the seating bores. While no very special accuracy is necessary in these holes, it is quite easy to set up the angle-plate to bore them in the lathe, and it definitely avoids the risk of getting them in the wrong place through undetected wandering of the drill, which only too frequently occurs in ordinary drilling operations. Always remember that while there is nothing against taking short cuts in machining operations, one should always be certain that they really *are* short cuts, and lead unerringly to the correct destination. How many of us can remember, when on ■ hiking tour, having taken "short cuts" which led us through hedges and ploughed fields—and finally finished up in ■ bog or ■ duckpond! It is often much better to take what *appears* to be the longest way round, in order to be quite sure of arriving at the right place in the end.

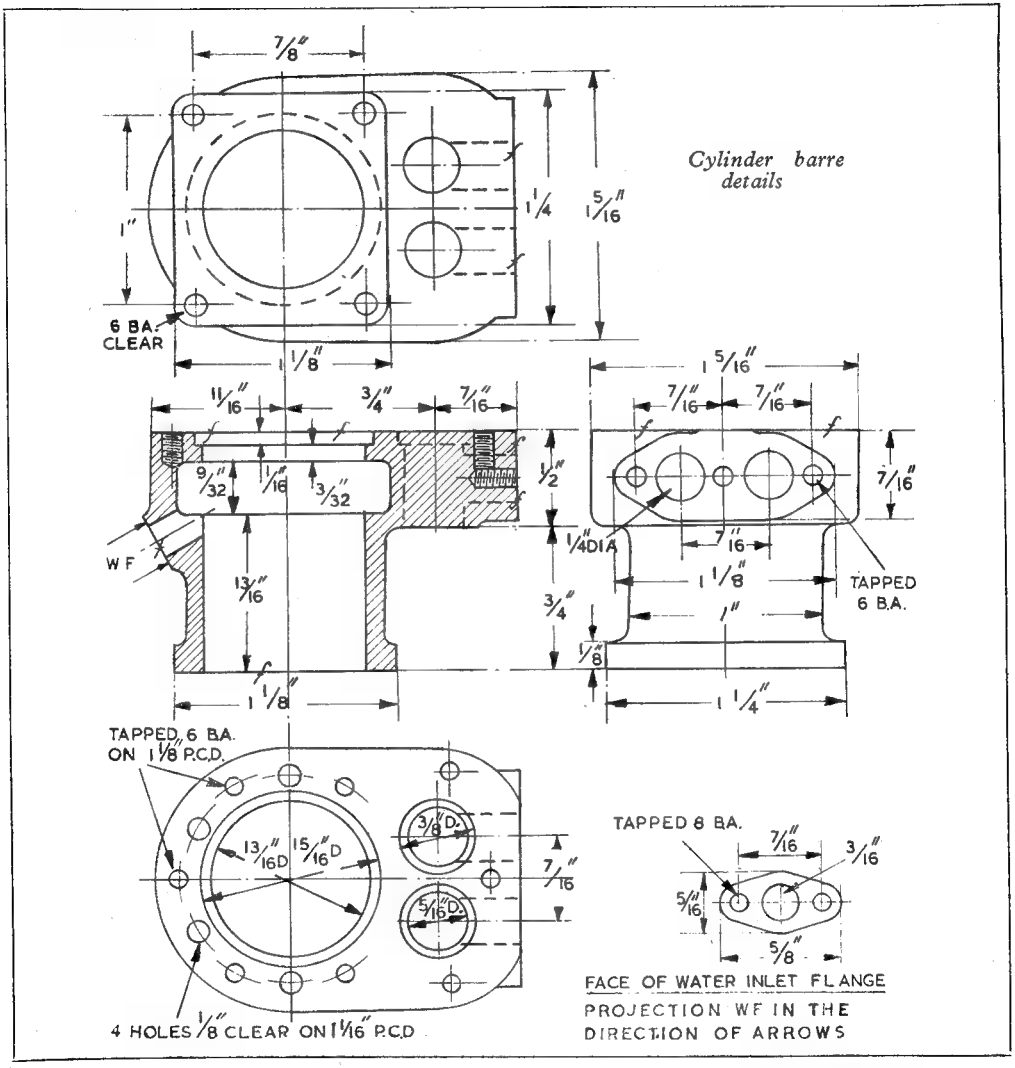
Cylinder-Head

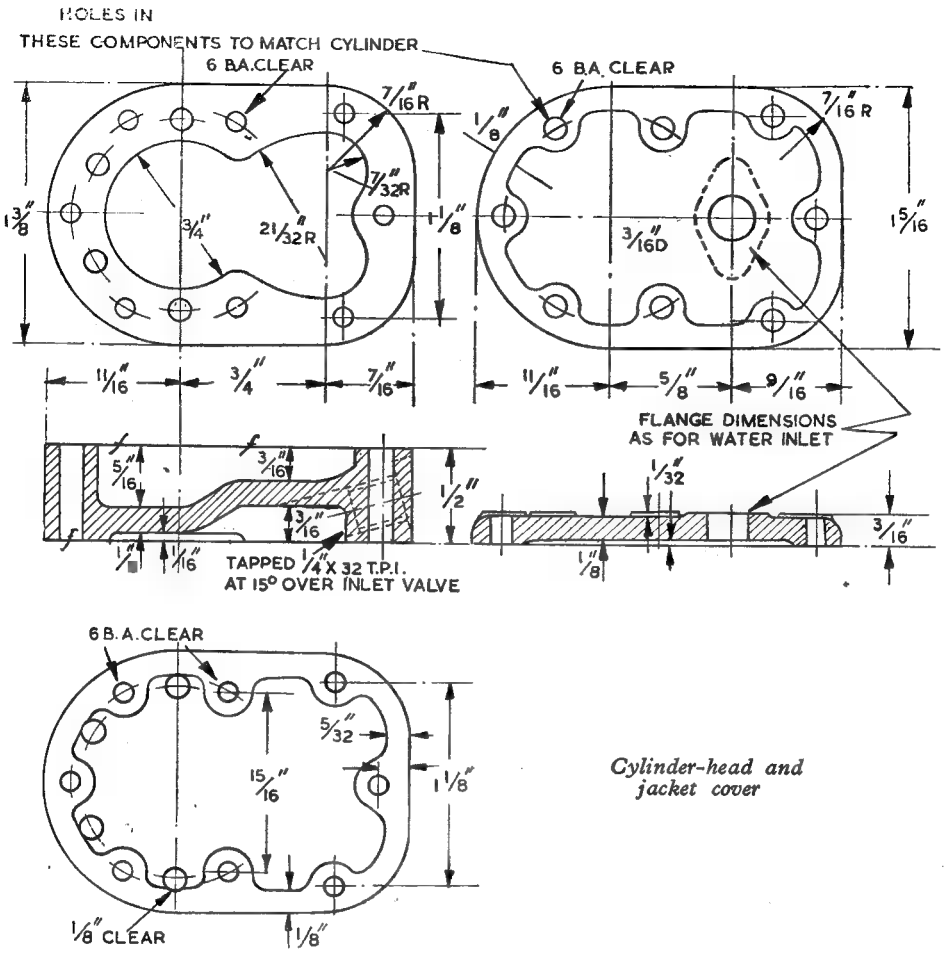
The only machining operations on this component are the facing of top and bottom joint faces, other than the machining of the sparking plug hole, stud holes, and water passages. As

*Continued from page 154, "M.E.," July 27, 1950.

the exact parallelism of these faces is not of critical importance, both operations can be carried out in the four-jaw chuck, but care should be taken to ensure accuracy and good finish, also uniformity in the dimensions of the two heads.

For machining the sparking plug holes, it is advisable to set the head up in the lathe, at the required angle to enable the drilling and facing to be carried out. Few amateurs have an adjustable angle-plate for work of this nature, but as a substitute, a piece of hardwood, with the face planed off at 15 deg. to the base surface, may be mounted on the angle-plate, and the head attached to it by wood screws through the stud holes. Note that the position of the plug is "handed" in the two heads, so that it comes over the inlet valve (the inner of the two) in each case. The location is not critical, but should be as close over the centre of the valve, and symmetrical in the two heads. After centring the plug hole with a centre-drill, the outer face of the hole should be machined to provide a true surface, to avoid throwing the tapping drill out of centre. This will bite deeply into the upper part of the head, and a sufficiently large diameter should be counterbored to take the body of the particular plug used, the depth being just sufficient to clean up at the lower side. At the inner end of the hole, it will break out obliquely into the combustion chamber, and it is advisable to bore it out beyond the thread diameter, to avoid ragged interrupted threads which might tend to collect carbon and cause pre-ignition. These are details which are more difficult to explain by drawings than in words.





Cylinder-head and jacket cover

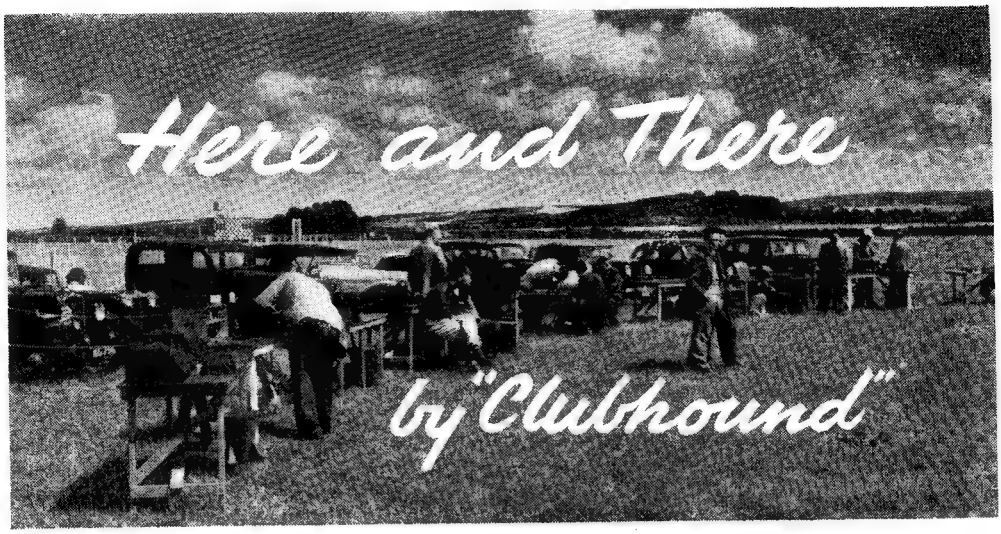
Jacket Cover

The main machining operations on this casting are the facing of the under joint face and the water outlet flange on the top side, which are easily dealt with in the four-jaw chuck. Before drilling the clearing holes for the studs, a check should be made to see how well the positions of the bosses coincide with those of the cylinder head, as some compromise may be necessary to cope with slight inaccuracy or discrepancy in the castings. It is not of the highest importance that the studs should be located exactly in the positions shown on the drawings, but it is most essential that they should pass through solid metal and not break out either in the gas pressure or water joints.

The clearance holes will of course follow through in the heads and jacket covers, and the top cylinder faces may have the tapping holes spotted off from the heads by clamping the latter temporarily in their correct position. It will, of course, be necessary to mark the respective sets of components—cylinder, head and cover—to show which belongs where. With the cylinder head temporarily secured to the barrel, the water communication holes may be drilled in both parts at once, breaking into the annular water space of the barrel. It is an advantage to slot these holes out sideways with a riffler or rotary file so as to provide the maximum water communication space from the barrel to the head and thereby promote free water circulation.

Finally the joint surfaces on the head and cover should be lapped to produce a perfectly flat joint surface; the upper surface of the head is similarly treated, after the liner and valve seatings are inserted and the face finally machined. The inside of the combustion chamber should be as clean as possible, and preferably polished, to inhibit the adherence of carbon and promote thermal efficiency.

(To be continued)



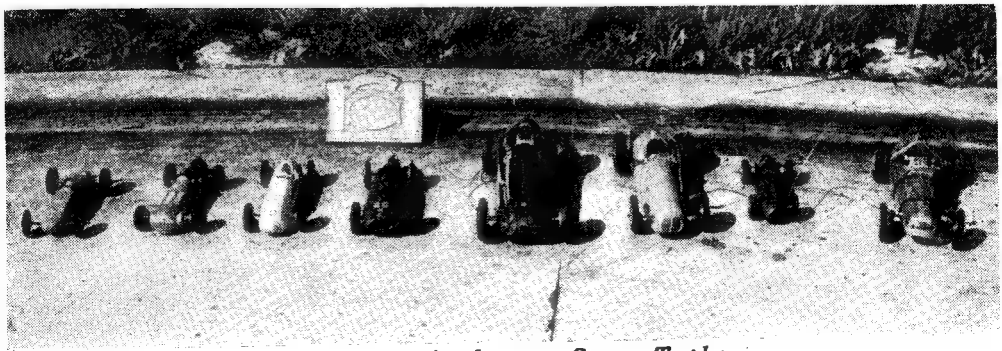
IT seems just the other day that I was peering inquisitively into the inner mysteries of the models at the 1949 " M.E." Exhibition. Judging from the number of model car entries, this year seems to have caught quite a number of the enthusiasts napping, too; but after all, perhaps it's only the lull before the storm, and we hope next year to see very many more of our readers taking an active interest in this very live branch of model engineering.

This year's Russell and Sutton trophies were run off at Eaton Bray on July 16th, between some of the many rainstorms which were a feature of that most memorable weekend. Both these events are for home-constructed cars, the subtle difference being that the Sutton rules stipulate home-built engines up to 5-c.c. only, as well as chassis and body, and the speed is not a deciding factor unless two entries happen to tie for first place.

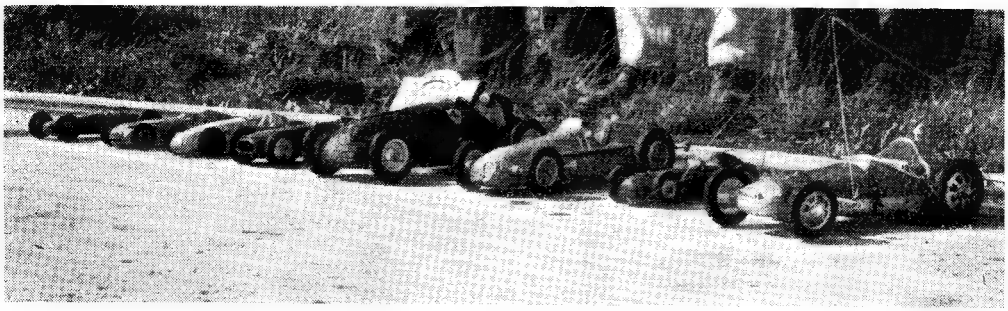
The judge for both events was Mr. Arthur-Brand, Associate Editor, THE MODEL ENGINEER, who had quite a tough time trying to sort the Gorgeous from the Truly Beautiful. It was most heartening to see such a fine array of true scale models, ranging from the successful Bugatti to the formidable 158 Alfa Romeo, present-day holder of all Grand Prix records, and the futuristic B.R.M., Britain's Grand Prix hope for the future.

The Sutton Trophy was hotly contested, last year's winner, our old friend A. F. Weaver, having to retire almost before the fireworks started, with stripped threads in the plughole! When, upon completion of the judging, the points were added up, C. W. Field emerged the winner with his 158 Alfa, E. V. Snelling being a very close second, only two points behind, with his exceedingly true-to-type version of the 4CLT/48 San Remo Maserati. The full list of results is as follows :—

C. W. Field, Alfa Romeo, own 5 c.c. engine, speed 34.6 m.p.h., scale points 70 ; E. V. Snelling, Maserati, own 5 c.c. engine, speed 66.6



The runners in the 1950 *Sutton Trophy*



Note the neat, scale appearance of the cars

m.p.h., scale points 67; R. A. Wilkinson, Maserati, own 1.5-c.c. engine, speed 31.8 m.p.h., scale points 59; L. W. Tillett, Tilley I, own 5-c.c. engine, speed 45 m.p.h., scale points 57; E. Snelling, Talbot, own 2.5 c.c. engine, speed 50 m.p.h., scale points 47; A. F. Snelling, Talbot, own 2.5-c.c. engine, speed 25.7 m.p.h., scale points 47; L. Kays, 1B, own 2.5-c.c. engine, speed 53.5 m.p.h., scale points 45; F. E. Howlett Mercedes, own 1.5-c.c. engine, speed 30.8 m.p.h., scale points 40; K. Robinson, B.R.M., own 2.5-c.c. engine, speed 54.8 m.p.h., scale points 38.

It will be noticed immediately, especially by the competitors who read this, that the scale points, even of the winner (and this will be found to apply also in the case of the Russell Trophy which follows), are quite low for the quality of workmanship which prevailed. This, I would like to point out, was due to several omissions on the part of constructors, such as no rear view mirrors, no front suspension in some cases, and a most unfortunate decision on everyone's part to dispense altogether with any form of rear suspension.

C. W. Field carries out a last-minute adjustment on the Sutton Trophy winner, his 158 *(home-built) Alfa Romeo*

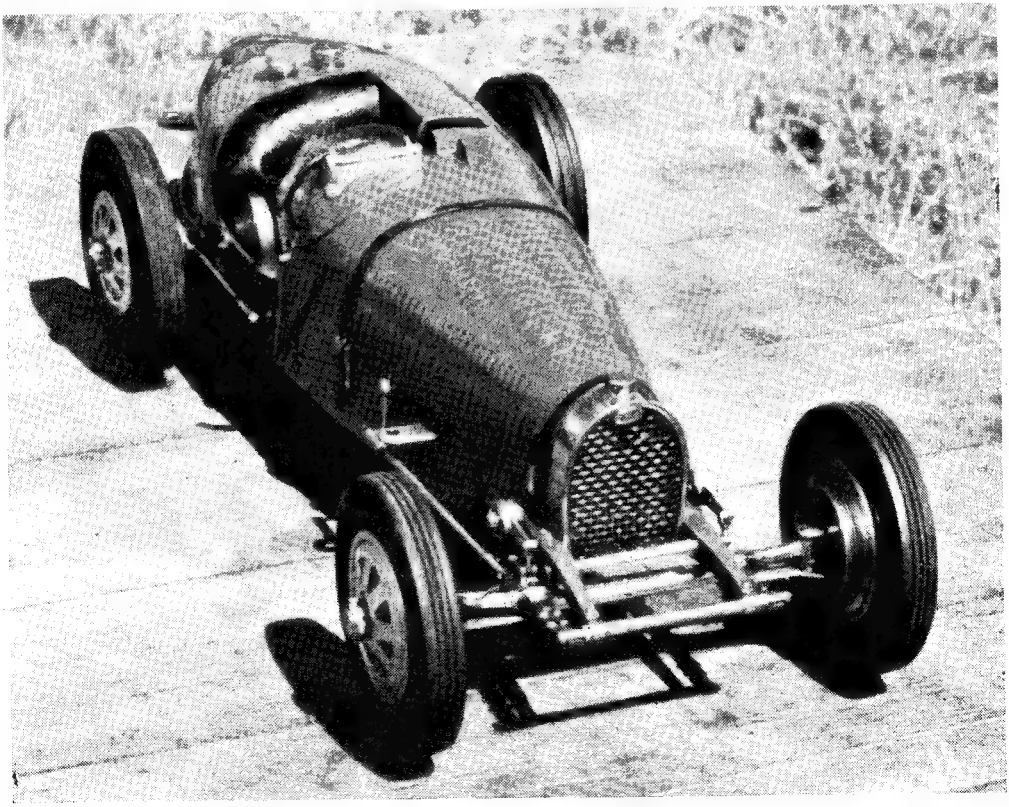
The Russell Trophy attracted a round dozen entries, many of them still suffering from various teething troubles. Here, again, however, a fine collection of motor cars came to the line to prove that, entirely apart from appearance, they were capable of competing with the cream of the sheer-speed merchants.

The lucky man was once again W. P. Jones with his now famous Bugatti, which collected 79 scale points and turned in an average speed of 82.6 m.p.h. Runner-up was J. Gascoigne with his 5-c.c. ETA-engined Dowson Special, 71 scale points and an average speed of 58.6 m.p.h. Fastest time of the day was put up by D. Garrod's *Fry Pan*, an apt name for the marque, which gyrated at 105.8 m.p.h. The trophies were presented by Mrs. J. Batten and Mr. Arthur-Brand.

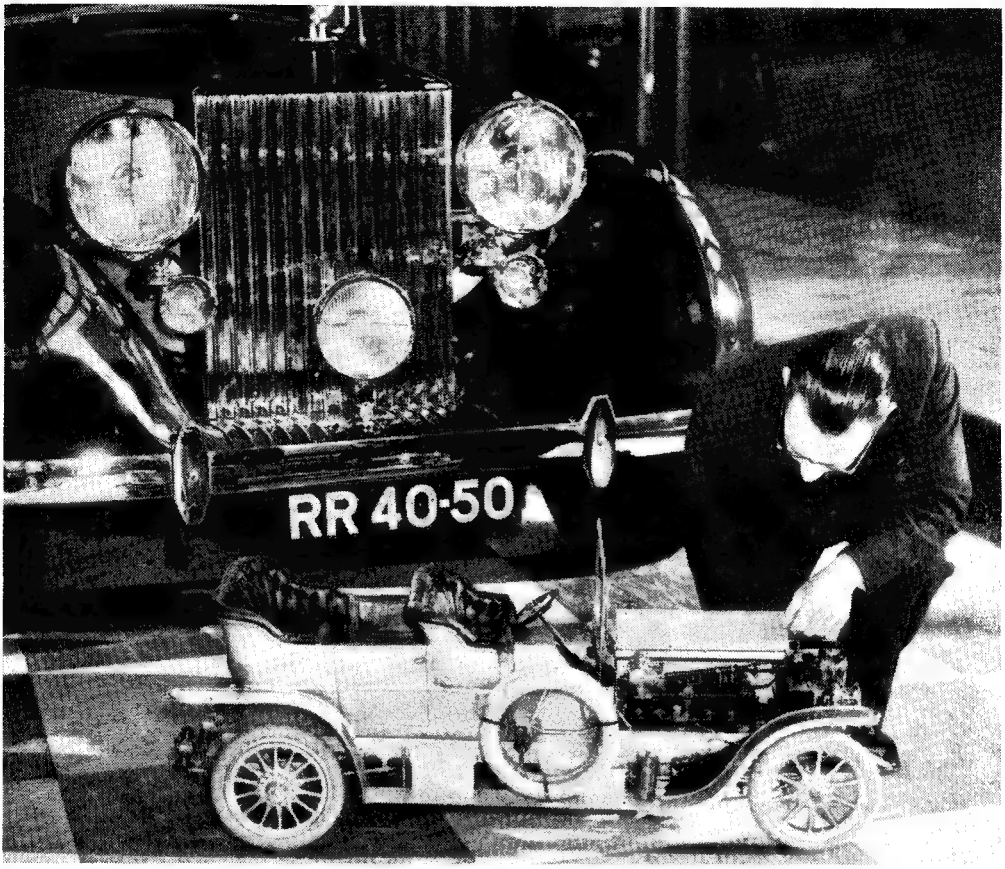
Here is an important announcement for those of you who will be competing in this year's "M.C.N." National Speed Trophy events. Following discussion between a representative of the donors, Messrs. Percival Marshall & Co. Ltd., and the hon. secretary of the Model Car Association, Mr. G. E. Jackson, it has been decided that both heats and finals shall this year be run over the "sprint" distance of a quarter of a mile instead of the half mile as last year.

I often get letters from "vintage" enthusiasts who ask why they don't see more of the old 'uns in our columns. Well, I have had a browse through the files and here are two models which should touch the heart of every modeller. The famous "Silver Ghost" was built in 1907, and this exquisite scale replica of the marque was the one which accompanied the ever-popular "Phantom III" to the New York World's Fair in 1939. The other picture shows the first Morris car ever to be produced, and is a two-seater, 12-h.p., four-cylinder machine. It made its debut in 1911 and was shown at the "Fifty Years of Progress" Exhibition in Piccadilly, July, 1946, as depicted here, in scale form. The writer, unfortunately, has no idea who made either of the models; he would, therefore, greatly appreciate hearing from anyone who could give further details regarding their birthplaces and creators.

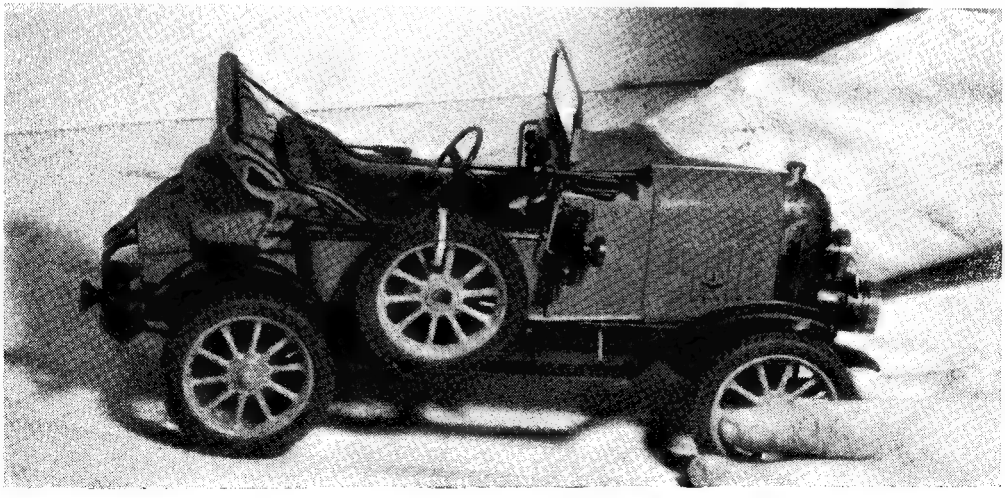
Competitors in the 1950 Russell Trophy event. Mr. Jones, the winner, is seen centre holding the trophy



Mr. Jones's famous Bugatti, after winning the Russell Trophy



Scale model of 1907 "Silver Ghost," posed in front of the Rolls-Royce "Phantom III" which it accompanied to the New York World's Fair in 1939



A scale model of the first Morris car

It occurred to me recently that it would be quite a good idea to introduce readers to some of the names in miniature motor racing. You all read from time to time about this person and that "doing" some fabulous speed, and it is only natural that you should sometimes wonder just what sort of a chap he is and how he started in the world of models.

To start the ball rolling, I am going to introduce you to an enthusiast who, although hardly one of the pioneers of the game, has been very much in the limelight recently—Mr. Cyril Catchpole, secretary of the Surrey club, and Southern representative of the recently formed Dooling Enthusiasts Club. After a hard week's work running an automobile business in Warren Street, Cyril is always ready for a run with his Dooling, his formidable collection of trophies being ample proof of his meticulous preparation, and ample knowledge of his equipment under most conditions. Started with a home-built special powered by a Series 20 McCoy engine, driving through a clutch and bevel gears to the rear wheels. Enjoyed the notoriety of being Britain's fastest clutch equipped car, attaining a speed well into the nineties. Latest addition to the racing stable is a 5-c.c. Dooling-powered B.R.M. which has already exceeded 90 m.p.h. and promises well for the future. Is not a model engineer in the accepted sense, in that he has neither the time nor the space to devote to a workshop; but he has certainly amassed a considerable knowledge of miniature high-speed internal combustion engines, a knowledge, incidentally, which he is always ready to share with others less knowledgeable than himself.

Mr. C. M. Catchpole, Hon. Secretary Surrey M.R.C.C., Southern Representative, the Dooling Enthusiasts Club, etc., poses with his Dooling car

I would point out in closing that there is no order of precedence in these introductions, the governing factor being the order in which the necessary photographs and other material come to hand.

Race-car Notes and Tips from the U.S.A.

by Howard W. Frank

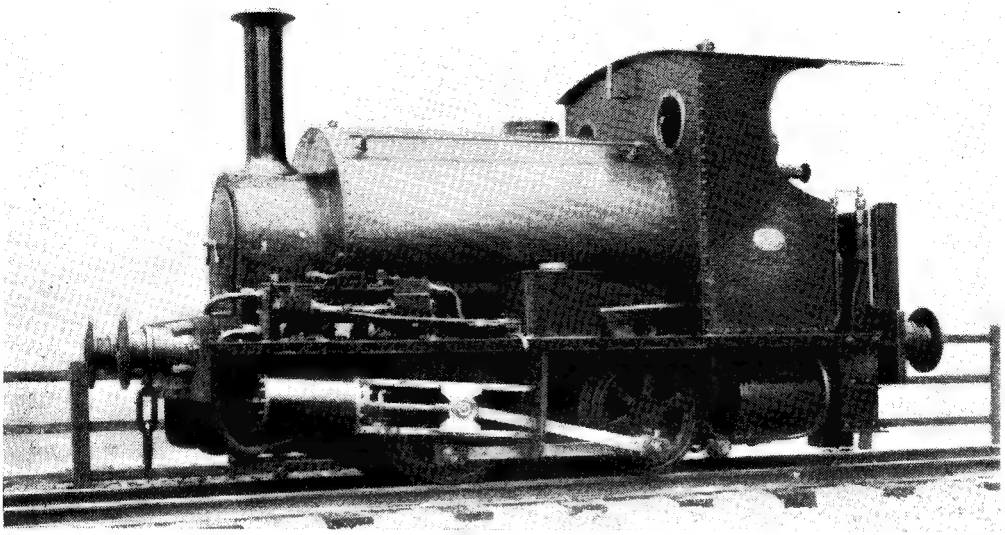
As the 1950 racing season advances, there has been a slight increase in performance by most of the American cars, with more and more of the custom built prototypes doing in excess of 130 m.p.h. Racing on this side of the ocean has now got to the point, especially at eastern meets, where it is necessary to do better than 133 m.p.h. to win a trophy. Since the average meet has over fifty entries, each club is awarding 16-18 trophies, and the pay-off is usually on a basis of one trophy for each three cars entered in a class. Custom prototypes comprise about 60 per cent. of the field, with manufactured prototypes about 30 per cent., and the spur-geared streamliners only about 10 per cent.

By the middle of June only one record changed hands, that being the I.M.R.C.A. custom prototype record at 140.62 m.p.h., now held by Howard Fox of Pennyslvania with a Cliff Fox car, Dooling powered, with magneto ignition and 1.84 gears. Although rail race-cars have been equipped with magnetos for two years now, they are only just finding favour with the cable racers. The most popular magneto is the Hornet, but there are a number of home-made units running well.

In the 10-c.c. class there has been very little development done with glow-plug systems, but one of the latest ideas that has worked successfully is to have the glow-plug constantly connected to a 1½-volt battery in the car, rather than the elimination of the battery connection after the engine fires. Performance of glow-plug operation has been increased by this method, but the life of the plug itself is diminished. The battery system used is six Pencell units soldered in parallel.

Back in about 1945 we replaced the stranded airplane cable used for the cable tracks with a 0.031 in. semi-tempered music wire. Speeds with the lighter cable jumped considerably, but when cars consistently went over 120 m.p.h. it was decided to increase the cable size to 0.046 in. for a 1/24th mile track for safety reasons. Performance of our cars also increased when we standardised the height of the cable connection at the centre post to be 1½ in.-3 in. above the track surface, thereby allowing the cars to ride flat on the track.

To keep the interest of the slow fellows, some of the mid-west clubs are now holding "Team Races," in which all the contestants draw numbers from a hat to see what team they are in. Usually from four to six cars are grouped as a team, depending on the number of total entries. To decide the winners, the average speed for each team is computed, then each member of the winning team receives a trophy. Team races encourage the slower fellows, as the faster men will assist them in getting the utmost out of their car so as to bring up the team's average speed.



"LADY MARGARET"

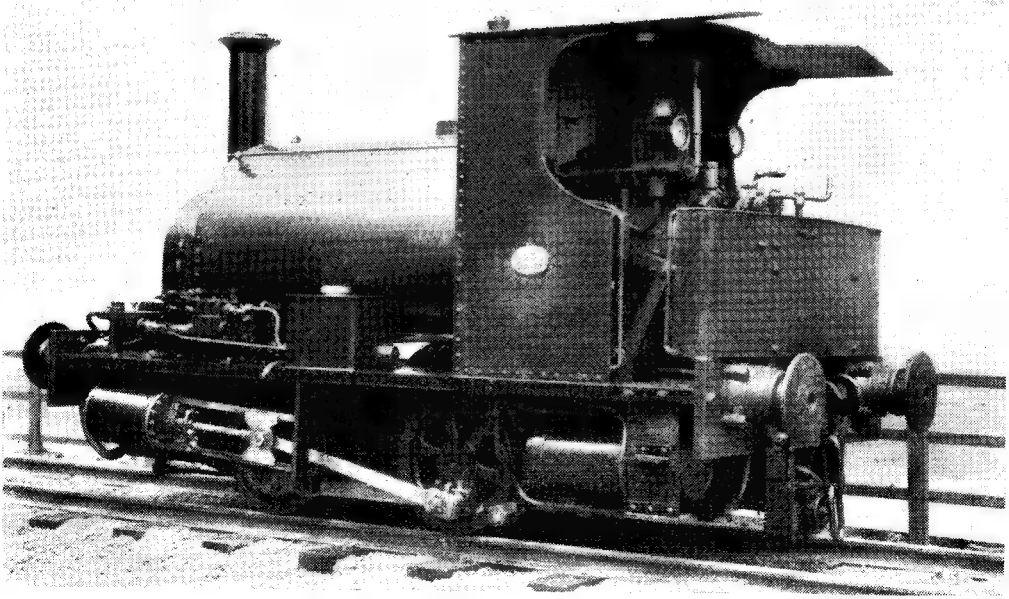
THIS 5-in. gauge industrial-type locomotive was built some years ago, from fond memories of her namesake, now, alas, indeed no more than a memory.

Lady Margaret, of fond memory, was built by Falcon in 1885, and worked on the three-mile private track from the Kingston-on-Soar gipsum pits to Kegworth L.M.S. station, until the end of the last world war.

Misfortune, not old age, brought her long record to a close, and now her little namesake works as patiently, on a garden railway, as reserve engine, to her larger sister, *Ann of Holland*.

She is a general favourite with the many children who ride the bogies and like the little old-fashioned engine with the long funnel and the little dome in the cab.

—M. E. RODGERS.



Lobby Chat—"Election Results"

by "L.B.S.C."

AS I haven't quite finished the drawing of the boiler for *Pamela*, and at time of writing, the state of the thermometer isn't exactly appropriate to brazing jobs—even the thought of it is enough to bring on perspiration!—let's have another five minutes or so in the lobby. What's that—tea-bottle too hot? Well, cool it off a bit in the water-crane tub outside the door, like we did in summer on the old "Brighton." Judging from the number of replies, both direct and *via* Great Queen Street, to my recent query as to whether anybody wanted to build a 2½-in. gauge engine, the answer is, as they say at Westminster, in the affirmative. Commenting on my own remarks about it, some writers say they were aware that blueprints of 2½-in. gauge engines of your humble servant's design, were already available; but they would much rather follow a more-or-less detailed description of something fresh. Others say there is no engine in the list, to suit their particular fancy. Some of the correspondents say that they are first-timers who would like to have a go at something with more wheels than *Tich*, but are chary of tackling too big a job, and a fairly simple 2½-in. gauge tender engine, capable of passenger work, would fill the bill. Others still, fully endorse my remarks about the lower cost, limited equipment, lack of trackage space and so on, and say one or all of the conditions apply to their own case. Taking it by and large, the replies were interesting and useful.

Different Folk, Different Fancies

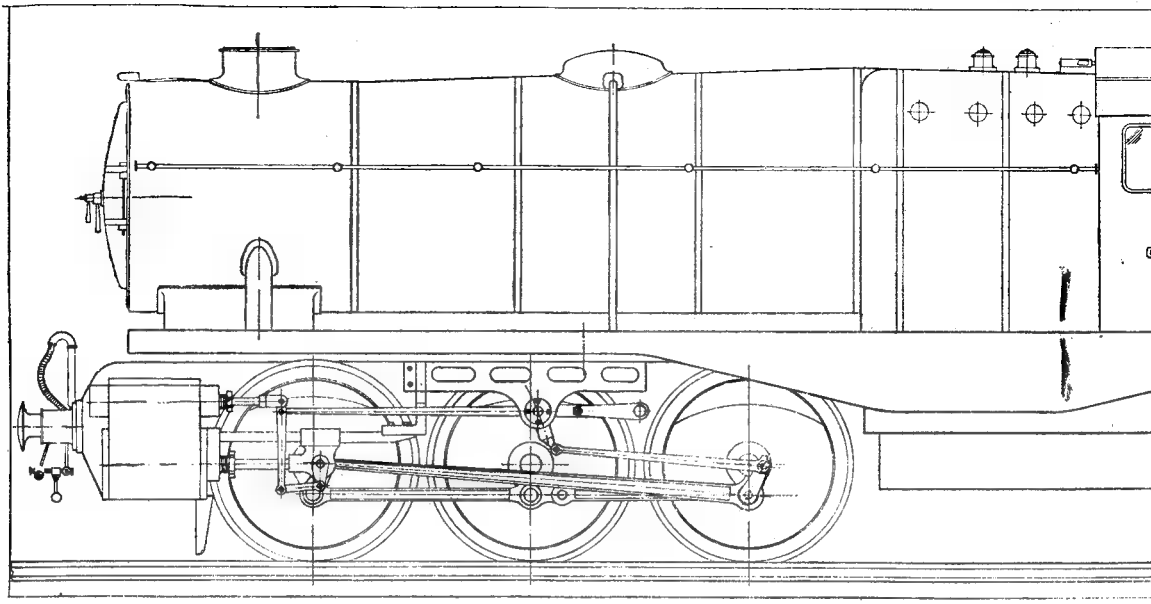
Here is a brief analysis of the letters that came in; I must confess that several of them raised a smile. Maybe you'll recollect that I distinctly asked that the job shouldn't be too complicated, owing to the comparatively small size of the engine, and lack of space to get components between the frames that were not too clumsy and yet strong enough for the job. Well, as Ripley says, believe it or not, just as you please, but in the very first batch of letters, were requests for a 2½-in. gauge Southern "Lord Nelson," with four cylinders, 135 degree cranks, and four sets of valve-gear! Right on top of that, came another asking for a four-cylinder G.W. "Castle" of the latest type; several other correspondents also asked for this, in later letters. Then came a request for a three-cylinder L.M.S. compound, with three sets of valve-gear; and several other writers plumped for a full description of my own *Tugboat Annie*, which has four cylinders, 135 degree cranks, Baker gear outside, and Holcroft gear inside. With all due respect to our worthy friends for their enthusiasm, I'd be glad to know, if they constitute the above as simple jobs, what would they consider a really complicated one, excluding the Southern *Leader*? Incidentally, it was suggested that a rebuild of that job, on the lines of *Pamela*, wouldn't be a bad idea; and about that very subject I'll have a few words to say later on.

Old Favourites

The greater majority of the letters favoured an old-timer; some wanted a resurrection of an extinct class of engine, others asked for one of a type which was still in active service, but of ancient vintage. I think the outline drawings of our friend Mr. F. C. Hambleton had a lot to do with the former, as many of the good folk who now read this journal, only arrived on this earth after some of the classes he has portrayed, had become "things of the past." It would be doubly interesting to bring one to life, and modernise the "works," as I have done with *Grosvenor* of the L.B. & S.C. Ry. It was pointed out that some of the classes could be legitimately called simple jobs, and among those specified were 4-4-0's: Great Central "Director," L. & N.W. "Precursor," Caley "Dunalastair," and Jimmy Stirling's Class "F" of the old "Slow and Easy." Of these, the "Precursor" would be the simplest, owing to the Joy valve gear; I have one in my own "running-shed," and a nobby little girl she is, too. The others have link-motion; and to squeeze four eccentrics between the cranks of a 2½-in. gauge job, is a nice bit of "watchmaking," apart from the links and lifting gear. It can, of course, be done; Mr. Keiller has a 2½-in. gauge 4-4-0 with inside cylinders, link motion, and a crosshead pump, and a lovely job she is—but there is a difference between the degree of skill possessed by Mr. Keiller and a raw first-timer!

Several readers suggested an outside cylinder 4-4-0 of the type designed by Adams (not our genial friend of *Caliban* fame, I hasten to add!) for the L.S.W.R., having seen the restored specimen on view some time ago at Waterloo Station. They were certainly fine engines, and a 2½-in. gauge version of one could be easily and successfully built; but the type did not gain the most votes, so we will put it aside for the time being. It has also been suggested several times, by various correspondents, as a fine subject for 3½-in. gauge, so maybe I might be able to give a few notes combining the two sizes, later on. The Stirling eight-footer of the Great Northern still has staunch champions, but careful workmanship would be needed in the cylinders and motion of such a small edition of this, as the boiler is limited in size; and poor workmanship, plus indifferent valve setting, would in the words of the enginemen, "knock the boiler stony."

Another proposal put forward by a minority with severely limited equipment, was for an ultra-simple tank or tender engine, on the lines of the "six-year-old's 4F" which I described in these notes some years ago; but I believe that back numbers containing the instructions, may still be obtained, and blue prints of the



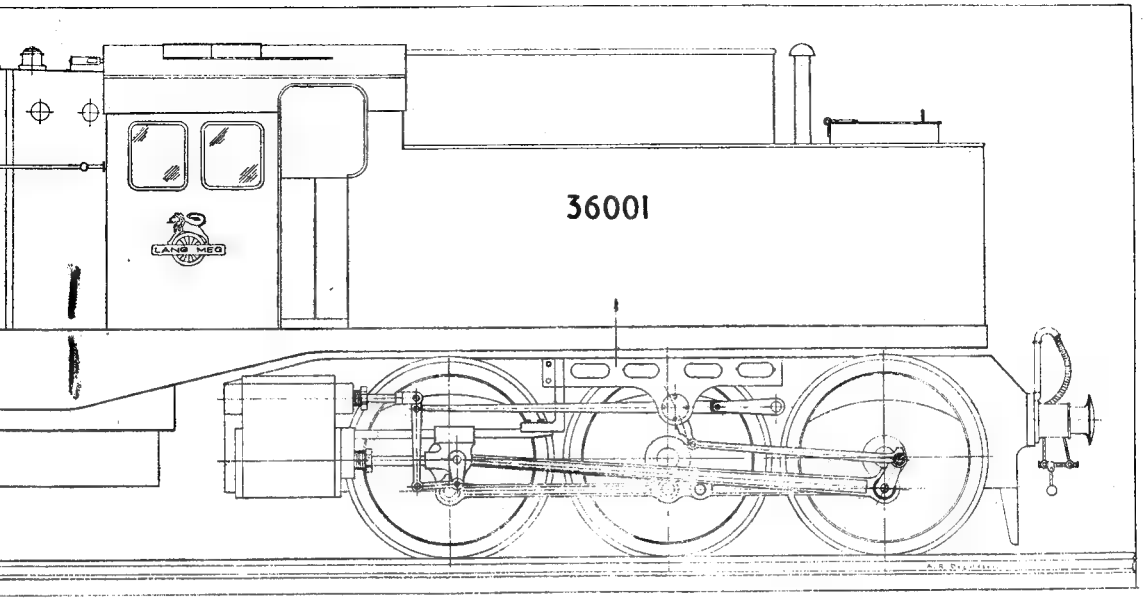
Drawn by] *Built thus, she WOULD have be*

engine are available. As the single cylinder and motion, and the simple boiler, could be applied to ■ 2½-in. gauge job of any desired outline, there is no need for repeating the details.

The Great Western—I'm afraid I'll never learn to call it "Western Region," you can't teach an old dog new tricks!—had, as fully expected, many staunch advocates, and a two-cylinder 4-6-0 was suggested; "Saint," "Hall," "Grange," and the "1000 class" all being mentioned. Here again, it would entail much repetition, as I described one in full (*Purley Grange*) during the war period, and built her myself. Blueprints are available, practically self-explanatory. It was this locomotive that anticipated the inclusion of full-length plate frames, separate cylinders and smokebox saddle, plate-framed bogie, and other innovations later adopted by the locomotive factory at Swindon; and ■■ history has an uncanny knack of repeating itself, don't be surprised if you happen to be at Waterloo one morning, and see *Pamela's* big sister steam in "right on the dot" with a West of England express!

The Winner

Of the three locomotives I tentatively suggested, there was not much enthusiasm for the North-Western goods engine, probably because these engines had never been "in the limelight," in ■ manner of speaking. They were useful engines, ■■ much in advance of the Webb engines of similar wheel arrangement, as their passenger sisters were ahead of the Webb compounds (did I hear *Jeanie Deans* whisper, "Oh, Curly, how *could* you!"). All right, Jeanie lass, we all know you are the exception that proves the rule. Like the average British citizen, they did their daily—or nightly—job of work, while well and able, in a quiet unobtrusive way, and passed to the locomotive limbo when through; but occasionally, also like certain folk, they proved themselves equal to any emergency. In my reminiscences, I mentioned that after leaving the railway in search of a bigger pay packet, I did some experimental work for ■ well-known motor manufacturing firm, and held ■ season-ticket between Euston, Coventry, and Birmingham. One evening, the "Precursor" that had brought the train from Wolverhampton to Birmingham, came off for some defect, and to my surprise, a "19 in. goods," clean and apparently in good fettle, backed on to the eight-coach train, booked to do the run to Euston in two hours non-stop. And do it she did! Not by any mad downhill racing; the driver was apparently a man of experience who knew better than to run the little wheels off their axles. The start from New Street coming south, begins with a sharp drop through two tunnels (I believe the grade is 1 in 77) followed by ■ "doorstep" up, of about 1 in 50; after that, it is a steady downhill run to the south side of Coventry, except for a slight hump from Hampton-in-Arden to Beechwood Tunnel. Well, that old cat started the train as though it were matchboxes full of feathers, and slipped down through the tunnels like a monkey sliding down a greasy pole. She took the "doorstep" in her stride, the only indication being an extra loud snort from the chimney, and a few flying cinders; then she settled down to it. I was in the next coach to the engine, and could tell how fast the wheels were turning, by the "ticking" of the vacuum pump. She accelerated to a little over 65 m.p.h. as near as I could judge, and held it. The only indication of ■ change of grade, was that the exhaust changed from ■ cat's purr to ■ tiger's purr ■■ the driver



VOULD have been a "Leader" [*A. R. Donaldson*

dropped the lever a little. He went through Rugby a bit on the quick side, but nothing to be scared about, and accelerated up the long drag to Kilsby Tunnel like nobody's business; after that, we might have been on a cable tramway, for all the difference the gradients made to the speed. It was the finest example of sustained steady-speed driving that I ever remember experiencing, though it certainly wouldn't have earned the approval of certain stop-watch manipulators, who reckon a driver shows "lack of enterprise" if he doesn't tear down every favourable grade in an effort to beat the timetable, irrespective of the cost of maintaining locomotives subjected to such treatment, when not intended for it. If an engine is built for speed, O.K. let her go; I'd be quite happy doing *Lady Vera* speed on a full-sized *Tugboat Annie* (she would do it!), but I wouldn't chance half of it on a full-sized *Caterpillar*.

Bonnie Scotland voted for the Jones 4-6-0 Highland goods engine, almost to a mon, ye ken, bar the few staunch Caledonians who wanted a "Dunalastair"; but it was nothing to the shout of approval which came from the North Eastern area, when they saw the suggestion for a North Eastern 0-8-0. The votes for this type of engine easily headed the poll, so—circumstances and the K.B.P. permitting—a not-too-long-drawn-out serial story on how to build one of the class T engines, will commence, as the tale of *Pamela* draws to its conclusion. My nearly-worn-out noddle cannot undertake too many jobs at once, nowadays, and it will take me some time to get out a tentative drawing (or "development drawing" as they call it in full size) and settle the principal dimensions. We shall, of course, modernise her, and the boiler and "works" will be to Curly standards, to get the utmost work for the least steam. It is a wee bit more tiresome to arrange this on a 2½-in. gauge job, than on a larger one. Our friends up in the North-East corner have also suggested that I include dimensions and notes for both 3½-in. and 5-in. gauges. A 3½-in. gauge engine can be built from the 2½-in. gauge instructions by increasing dimensions in the proportion of 5 to 7, and for 5-in. gauge by doubling up, using the notes on *Maid of Kent* and *Minx* as a guide to the cross-sections of various components, width of frames, wheels and so on; but more of this anon.

In case any of our 2½-in. gauge enthusiasts have any castings in stock that they might want to work in, here are some of the sizes I propose to adopt. Coupled wheels 2$\frac{1}{16}$ in., which is near enough to 4 ft. 7½ in. to make no odds; most "stock" 2½ in. diameter wheel castings can be turned down to that size without making the rims look too spidery. Most of them are on the heavy side, anyway. They will need big bosses, as the cylinders will be $\frac{7}{8}$ in. bore and 1¼ in. stroke; we'll give her a 28 in. stroke instead of 26 in., for luck, and make that Bill Massive ten-foot connecting-rod do a bit more towards "keeping gravely in time with all the harmonious revolving masses" as friend Hambleton poetically puts it. Incidentally, there wouldn't be much harmony if the knuckle pin came out of the front section of coupling-rod, and the crosshead hit the crankpin boss as soon as the leading wheels got out of step! The late Driver Bill Irvin had that happen over in France during the Kaiser's war. When the R.O.D. officer came up, he said, "What the bluepencil have you been doing now?" Bill replied in that demure dry humorous way he had, "I dunno, I s'pose it's my fault, I think you better

give me the sack!" He said the "brass hat" had to let his face slip! Bill was a real nugget; he knew just how far he could go, and usually went the limit, just for the sake of devilment. I believe I told the story of how he tied up all the Saturday rush-hour traffic between Moorgate and King's Cross, for over an hour by working to instructions about condensing in the tunnels; and neither the L.N.E.R. nor the Metropolitan Ry. could do a blessed thing about it. He had them both in a cleft stick.

Frames will be 3/32 in. thick, with *Tich* hornblocks and $\frac{3}{4}$ in. angle buffer and drag beams; castings may be used if available. Feed pump same as *Austere Ada*. Boiler barrel will be 3 in. diameter; this is a little bigger than "scale," but as we are "modernising" the engine, it will be necessary. Personally I think the appearance will be improved, as the originals always seemed a shade on the long-bodied side. She will have all the Gateshead adornments, and a tender to match. I fancy that is all there is to say at the moment, so I'll get busy at the earliest opportunity. Eh! What's that? No, I decidedly haven't forgotten the "Canterbury lamb"—old *Invicta*. I've made several tentative sketches, but not yet decided on a satisfactory boiler. Please be patient—there is only one Curly, working against odds—remember the saying that everything comes to those who wait.

What Might Have Been

Earlier in this lobby chat, mention was made of a suggestion to describe a rebuild of the Southern *Leader* (??) on the lines of the rebuilt "spam can." As a matter of fact, a design for this very job has already been produced by Mr. Roy Donaldson, the draughtsman at Ashford Works, who makes blueprints from the drawings of the locomotives described in these notes. Here is a reproduction of it, which shows that our extremely practical friend has completely "canned" all the components that proved unsuccessful and inefficient on the original job, and has produced a locomotive that not only would do all the original was intended to do, but really looks like an engine. It would be cheap to build and maintain, reliable in service, and economical to run. The power bogies are entirely self-contained; and by judicious wangling of the ends of the frame, plus easily detachable buffer beams, could be made interchangeable. Even as shown, either bogie, or the complete boiler, could be taken out and replaced by a reconditioned unit, and the engine kept on the road for an indefinite period.

As will be seen, the locomotive is a cross between a Garratt and a Fairlie, being virtually a four-cylinder twelve-coupled tank engine with the coal-and-water capacity of a tender goods engine, the full weight available for adhesion, and the flexibility of a bogie coach. The reason for putting the rear pair of cylinders under the cab, instead of using the Garratt arrangement, is to reduce the length of steam and exhaust pipes, and allow of a simpler arrangement of flexible joints being used. On the $3\frac{1}{2}$-in. gauge edition, the steam pipes would have a coil in them, and the exhausts, simple sliding joints. The wheels are the same as on the original *Leader*, but the sleeve-valve cylinders and chain couplings have been replaced by ordinary outside cylinders with Walschaerts gear, the general layout being similar to *Doris* and *Pamela*, except that the drive is taken by the third axle. This allows a more symmetrical arrangement. In $3\frac{1}{2}$-in. gauge, the cylinders would be approximately 1 in. bore, $1\frac{1}{2}$ in. stroke, and the coupled wheels $3\frac{3}{4}$ in. diameter. The cantilever-girder main frame is retained.

The boiler is of the usual pattern, and would be $4\frac{1}{2}$ in. at the smokebox end, tapering out to 5 in. at the firebox. This is of the wide Belpaire type, and can be extended almost the full width of the main girder frames, one expecially good feature being that the grate and ashpan are entirely unobstructed, making it exceptionally easy to dump the grate and clean out the firebox. The tubes, flues, superheating arrangements and all accessories would be the same as I shall describe for *Pamela*, thus keeping the engine "standard" as much as possible. The boiler would be fed by a pump driven from one of the leading bogie axles, plus an injector close to the frame under the side of the cab, the latter being just an extended version of an ordinary L.M.S.-type tender engine's cab, whilst the tank and bunker are virtually a tender body mounted on the elongated main frame, with the advantage that there are no separate flexible pipe connections between it and the engine part, all connections being made by ordinary copper pipes and unions.

There is no denying that a locomotive of this type possesses certain advantages over a tender engine of similar length. The four cylinders, and the full weight being available for adhesion, would make it an immensely powerful machine, just the identical for hauling heavy loads of children at fetes and suchlike functions. The double-bogie feature would enable it to negotiate the "Johnny Horners" of a continuous line in a suburban back garden of average size, whilst the "reach" from the driver's car to the handles in the cab, is not nearly as much as on a tender engine of similar capacity. The size of boiler shown, would be ample to keep the four cylinders supplied with steam, under any conditions of service, provided of course that the workmanship in the cylinders and motion is of reasonable accuracy. I don't know at the moment, whether friend Roy intends making blueprints of all the details; but if he does, it would be worthy of the attention of those locomotive builders who not only want something "different," but something that will well repay the trouble of building it.

To Readers in U.S.A. and Canada

To clarify certain references in overseas correspondents' letters, and for my own protection, may I state here that I have no connection, business or otherwise, with any firm or person in Chicago; and I have never authorised any firm, or person, in that city, to use the letters L.B.S.C. either in advertisements or correspondence, for the purpose of selling blueprints, castings, or material of any kind. I hope this disclaimer will clear up such misunderstandings which have arisen, and save other good folk from trouble and annoyance.

Novices' Corner

The Removal of Wheels from Shafts

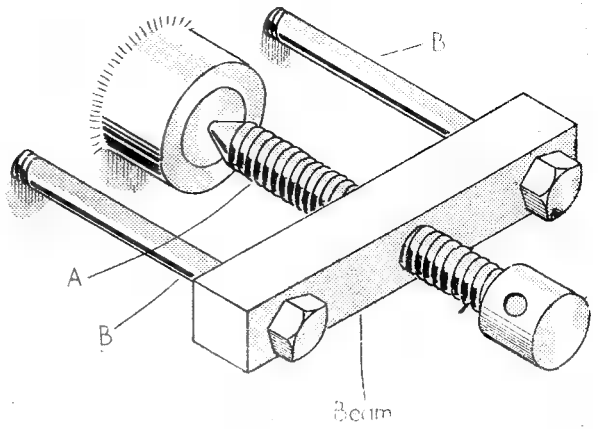


Fig. 1. A simple wheel drawer

THE removal of wheels from the shafts upon which they are mounted is an operation which, if not properly carried out, can readily cause damage. It may be taken for granted that the practice of hitting the wheel or the shaft with a hammer is quite incorrect, unless certain safeguards, which will be considered later, are adopted.

If no proper withdrawal tool is immediately to hand, it is always best to make one, for the work will then be carried out more easily and no damage will be caused to the parts. Moreover, if the tool is made adaptable, it will serve for work on wheels of varying sizes.

Wheel Pullers

Wheel pullers, as these devices are called, differ considerably in their construction. Some are complete in themselves, others make use of the wheel itself to support the tool in operation. A glance at a tool merchant's catalogue, and in particular that section which deals with tools for the motor industry, will show that the designs for wheel drawers are many.

The simplest form of wheel puller is that shown in Fig. 1. It will be seen to consist of a square section steel beam having a central screw *A*, which is either hexagon-headed or provided with a hole for a tommy bar, and two bolts or screws *B* which pass through the steel beam and are either screwed into the wheel which is to be withdrawn or are secured to it by nuts and washers. The necessary holes in the wheel are often provided by the manufacturers. When using the wheel drawer, the two screws are inserted and adjusted till the beam is square with

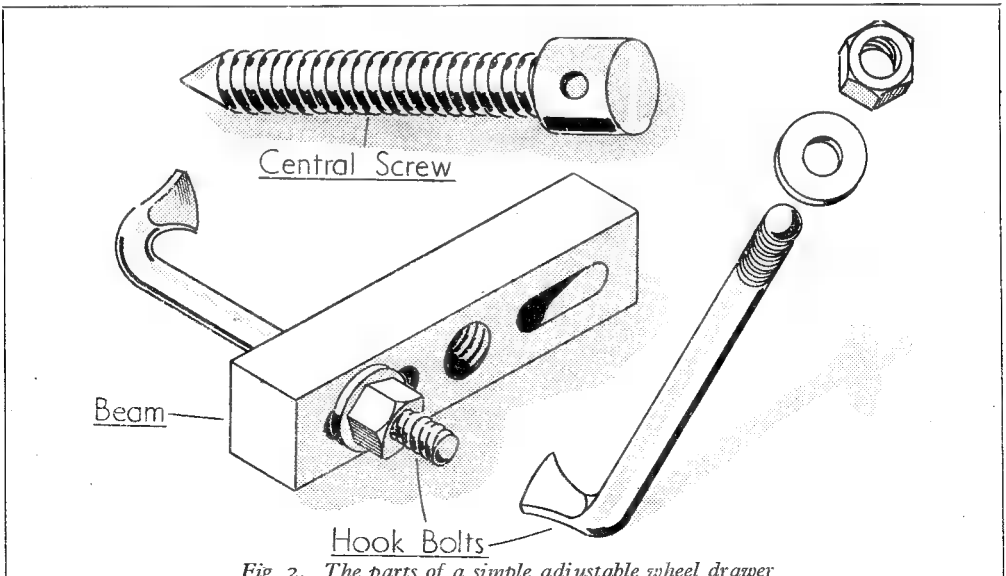


Fig. 2. The parts of a simple adjustable wheel drawer

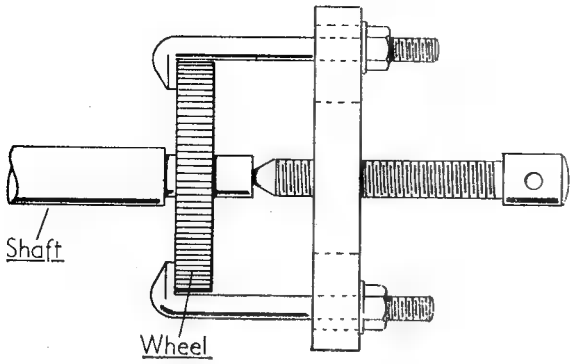


Fig. 3. Adjustable wheel drawer in position

the face of the wheel. The central screw, which is pointed, is engaged with the centre formed in the shaft. Turning the screw inwards then pulls the wheel off the shaft.

Clearly, in the form depicted the tool is only suitable for pulling wheels have tapped holes whose centres conform with those of the two screws *B*. The tool may, however, be made more universal if the beam is slotted, as shown in Fig. 2, and in addition is provided with the hook bolts seen in the illustration. In this form the plain bolts can be used at any centres within the range of adjustment, or, when it is not possible to use the plain bolts or screws, the hook bolts can be passed over the rim to engage the back face of the wheel, as seen in Fig. 3, which shows the wheel drawer in position.

A form of wheel puller in which three hooked members are used to give additional stability to the device is shown in Fig. 4. A tool of this type is useful when heavy work is to be undertaken, but it will be observed that its scope is somewhat limited, as no provision is made for adjusting the leg centres, consequently the hooked ends of these legs do not abut squarely on the work at all times. Most commercial wheel pullers have provision for adjustment to avoid this difficulty.

Self-withdrawing Wheels

Wheels are sometimes made so that they will withdraw themselves. The most elementary type of self-drawing wheel has two or more holes tapped axially in the hub or adjacent to it. Screws can then be passed into these holes to enable the wheel to be pushed off its mounting. When screwed in, the points of these screws abut against a shoulder or collar forming part of the wheel mounting, further turning of the screws then unseats the wheel. An example of this application is to be found in the brake drums fitted to some makes of motor car. Here the drum fits over the wheel studs and abuts against a flange machined on the wheel hub. The studs have enlarged shoulders to engage and register the brake drum which is a firm fit upon them.

It follows that some force is required to move the drum, and as it is not possible to pull directly on the rim, owing to the position of the brake dust-cover, the method described above is used to remove the part.

A more advanced yet simple form of self-drawing wheel is the magneto sprocket once fitted to motor cycles by the Triumph Cycle Co. of Coventry. In their article "Fitting Flywheels and Gear Wheels to Shafts," published on June 1st of this year, "Duplex" gave a detailed description together with an illustration of this very successful device, and reference should be made to this article for further information.

Hub Drawers

In addition to the various devices for withdrawing wheels which have already been described, a simple one-purpose tool is sometimes in tool kits supplied with motor cars. The purpose of this tool is to enable the road wheel

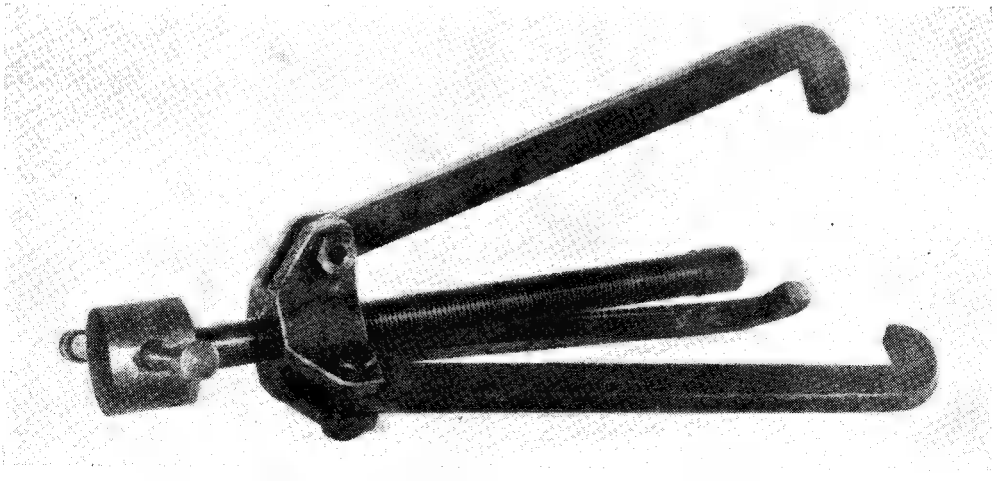
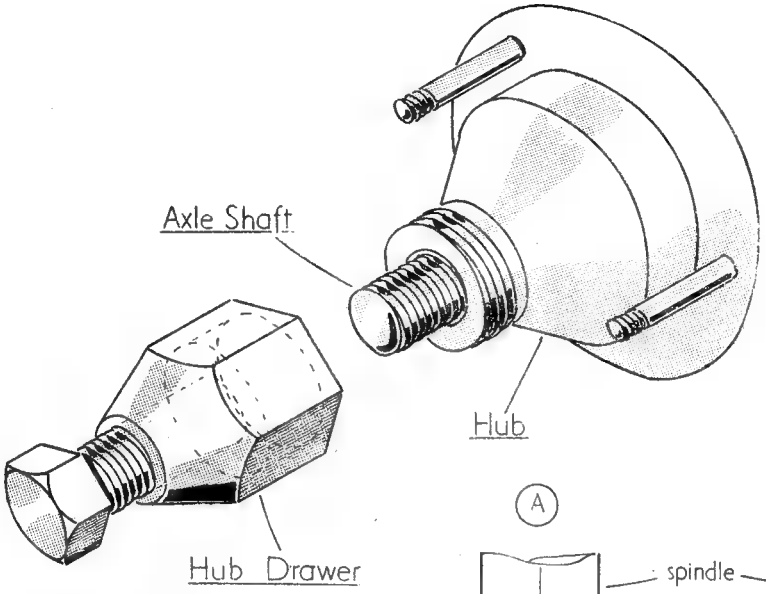


Fig. 4. A three-legged wheel puller

hubs to be withdrawn easily from their axles. As will be seen in Fig. 5, the device consists of a hexagon body threaded to fit over the end of the hub.

A hexagon-headed screw passes through the axis of the body, which is threaded to receive it. This screw presses on the end of the axle shaft when the drawer is being used; turning this screw inwards withdraws the hub from its shaft.



Left—Fig. 5. A hub drawer

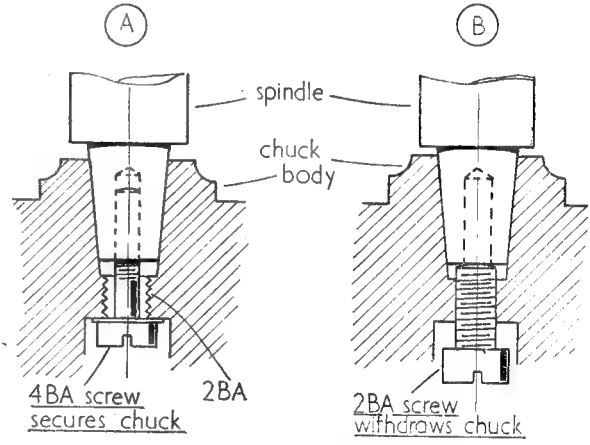
Where circumstances permit, this type of withdrawal tool has everthing to recommend it, for it is extremely easy to use, and is also extremely rigid.

When tools of this type are being used on hubs or wheels which are fitted to tapered shafts, it sometimes happens that the two mating parts grip so firmly that it becomes impossible to turn the extractor screw and so withdraw the hub. In this event the screw should be tightened firmly, and its head should then be given a sharp blow with a copper hammer. The effect of this blow on parts already under tension will usually be sufficient to cause the hub to leave the tapered shaft.

When designing small mechanisms, consideration should always be given to the easy withdrawal of any wheels, and provision for this purpose should be made.

An example, of practical utility in the workshop, is the means by which drill chucks may be secured to a drilling machine spindle and withdrawn from it, when the occasion arises, without damaging either the chuck or the spindle. The method is shown diagrammatically in Fig. 6A and B.

The chuck, as shown in Fig. 6A, is secured to the taper formed on the end of the machine spindle, by means of a 4-B.A. screw which passes through a hole drilled axially in the body of the chuck. This hole is tapped 2 B.A., a size which will clear the 4-B.A. screw, so that, when it is desired to remove the chuck, a 2-B.A. screw can be used as shown in Fig. 6B to push the chuck off the taper.



Below — Fig. 6. Method of securing and removing drilling machine chuck

The Removal of Wheels Without the Aid of Special Devices

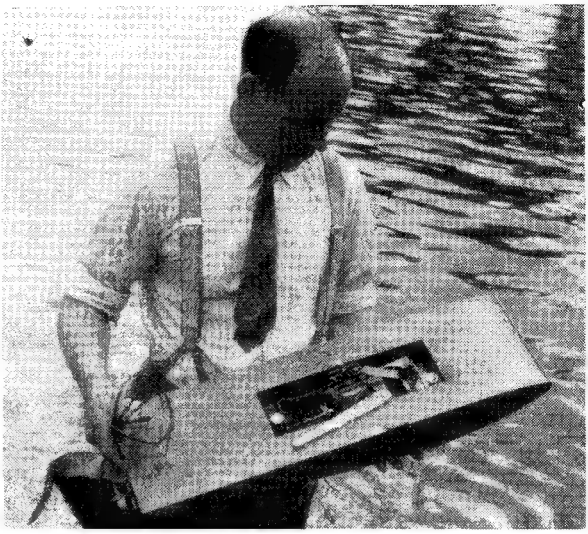
When no wheel drawers are available, and circumstances prevent a special tool being made, it will be necessary to resort either to the use of a lever or a hammer to remove the wheel. Both tools must be used with discretion, and their effect upon the mechanism as a whole must be taken into account.

For example, the removal of a magneto sprocket can usually be effected by using two screwdrivers or a pair of small tyre levers opposite to one another. Levering carefully, and with equal pressure, will dislodge the sprocket if, at the same time, the end of the shaft is given a sharp tap with a brass drift, a procedure which will need the help of a second person.

On no account should the sprocket be held in

(*Continued on page 251*)

The Derby Regatta



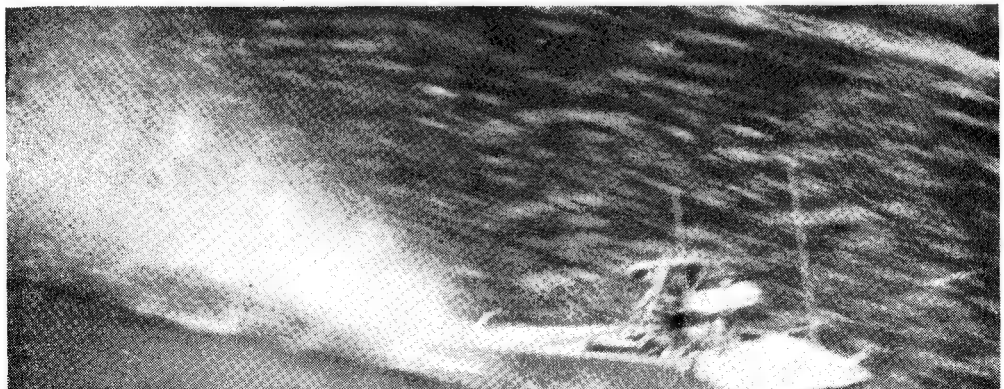
Mr. T. Dalziel (Bournville) with "Naiad II"

EXCEPT for a steady breeze, weather conditions were ideal for the Derby Model Racing Club's Regatta held at Allestree Park on a recent Sunday.

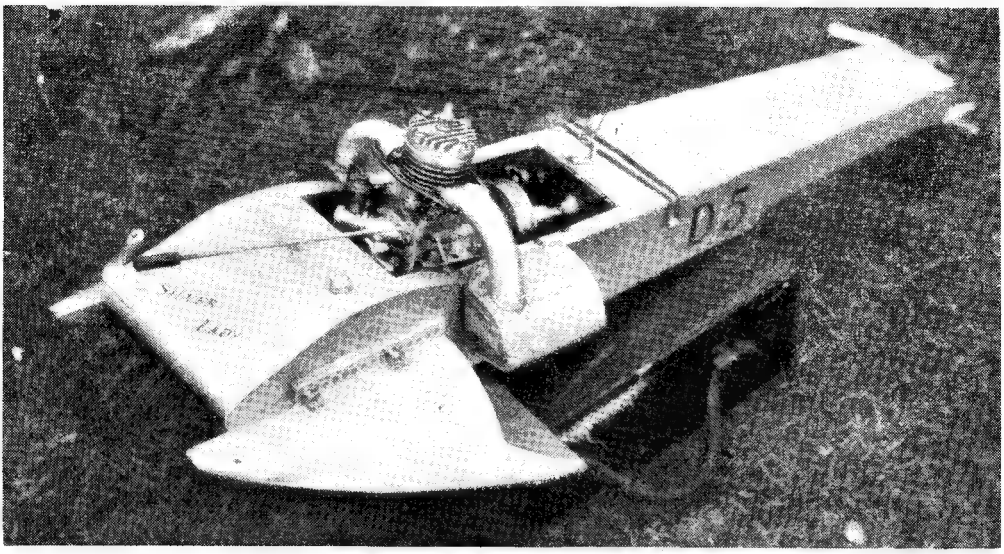
After an excellent lunch, racing commenced at 2.30 p.m. and excitement started early in the programme. Mr. Tomkinson gave us the first thrill when his 30-c.c. boat *Rene VII* broke its tether on launching and headed for "far away places," on a course that would have shamed many a steering boat. Fortunately, Derby Club's lake has soft sides, and is fringed with trees and bushes, and *Rene VII* ended up in a bush on the far side of the lake, where all attempts at rescue were foiled by large quantities of water thrown up by the propeller, until the engine ran out of fuel. Messrs. Pym and Brierley, directing operations from a rowing boat, were thoroughly drenched, to the huge delight of all not engaged in salvage. *Rene VII* suffered no damage and was soon running again.

The advantage of soft sides was again demonstrated in the Class "C" event when Mr. Mitchell's *Gamma* broke away on launching, through a faulty hook on the line, and steering a similar course to Mr. Tomkinson's boat, burrowed its way into the middle of the self-same bush, fortunately with no damage. Messrs. Pym and Brierley again retrieved in the rowing boat, and were advised to keep a ferret on board for future occasions!

Racing thereafter proceeded in the usual manner; some went, some didn't. Class "A" brought forth 3 entries, and was won by Mr. Williams (Bournville) with *Faro*, at 36.04 m.p.h.



Mr. Mitchell's "Beta" (Runcorn) at full speed



Mr. Pym's " Silver Lady " (Derby)

Neither Mr. Tomkinson (Altringham) with *Rene VII* nor Mr. Thomas with *Enid* completing the course.

Class " B " was a runaway win for Mr. Mitchell.

1st. Mr. Mitchell (Runcorn), *Beta* : 46.06 m.p.h. 2nd. Mr. Dalziel (Bournville), *Naiad* : 37.73 m.p.h. 3rd. Mr. Churcher (Coventry), *Annette* : 32.36 m.p.h.

Mr. Robinson (Coventry) with *Kingfisher* failed to get away.

Class " C " results were :

1st. Mr. Barnes (Derby), *Dagwood* : 37.73 m.p.h. 2nd. Mr. Mitchell (Runcorn), *Gamma* : 36.78 m.p.h.

Mr. Jackson (Derby) and Mr. Collier (Coventry) failed to get a run.

Class " C " restricted :

1st. Mr. Brierley (Derby), *Bitza II* : 43.51 m.p.h. 2nd. Colin Stanworth (Bournville), *Meteor IV* : 36.26 m.p.h. 3rd. Mr. Clare (Derby), *Imshi* : 34.09 m.p.h.

Mr. Wraith (Altringham), Mr. A. Brierley (Derby) and Mr. Thomas (Coventry) failed to finish.

Our thanks are due to the visitors from Bournville, Coventry, Altringham and Runcorn, who supported us so wonderfully, and we sincerely hope they enjoyed themselves.

Prizes were presented by Mrs. Jackson.

Novices' Corner

(*Continued from page* 249)

the vice while the end of the magneto shaft is banged with a hammer. No doubt such a procedure would effect the removal of the sprocket, but it would also most certainly damage the magneto both electrically and mechanically.

On the other hand, a wheel mounted on a shaft to which, for the moment, no other mechanism is attached, may be supported in the vice in a suitable manner so that the shaft may be struck with a hammer and driven out of the wheel, a brass drift being used to protect the parts. In this instance there is no subsidiary mechanism to be damaged.

Experienced workers will note that no mention has been made of mandrel presses and other advanced aids to wheel removal. Such tools are seldom found in the small workshop, and certainly not in the hands of beginners ; reference to them is therefore unnecessary.

"Another One"

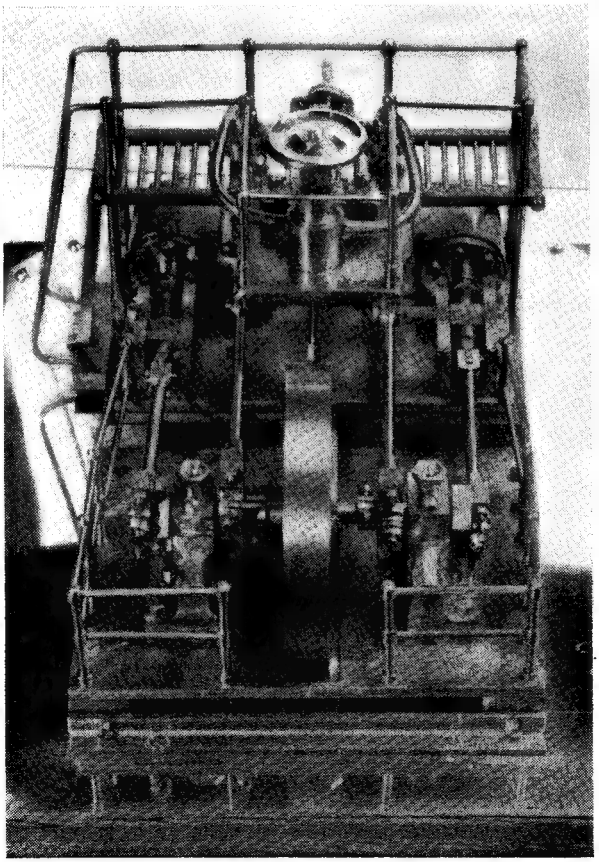
A Free-lance Stationary Steam Engine

by A. Howard Beere

THESE photographs of a free-lance stationary steam engine, intended to bear some resemblance to a mill engine, may be of interest to other readers.

They represent a further venture of mine in model engineering, and, I hope, show some progress since my first attempt, the photographs of which were published in the October 13th, 1949 issue of THE MODEL ENGINEER.

The two double-acting cylinders are of ½ in. bore and stroke, and fitted with piston valves. The cylinders once belonged to a twin oscillating engine of ⅜ in. bore that had proved unsuccessful owing to faulty machining and assembly, and were passed on to me for scrap. I soldered on valve chests, which were made from ½-in. square brass rod, rebored the cylinders to ½ in., fitted duralumin pistons, drilled the steam ports and made $\frac{3}{16}$ in. diameter piston valves which are actuated by eccentrics driven from the main shaft, the length of the valve travel being ⅛ in. Except for the cylinder castings, the 12-B.A. screws in the steam and exhaust unions and the flywheel (which was a 3 in. diameter model locomotive wheel casting) the whole model, including other screws and bolts, was made up from bar stock.



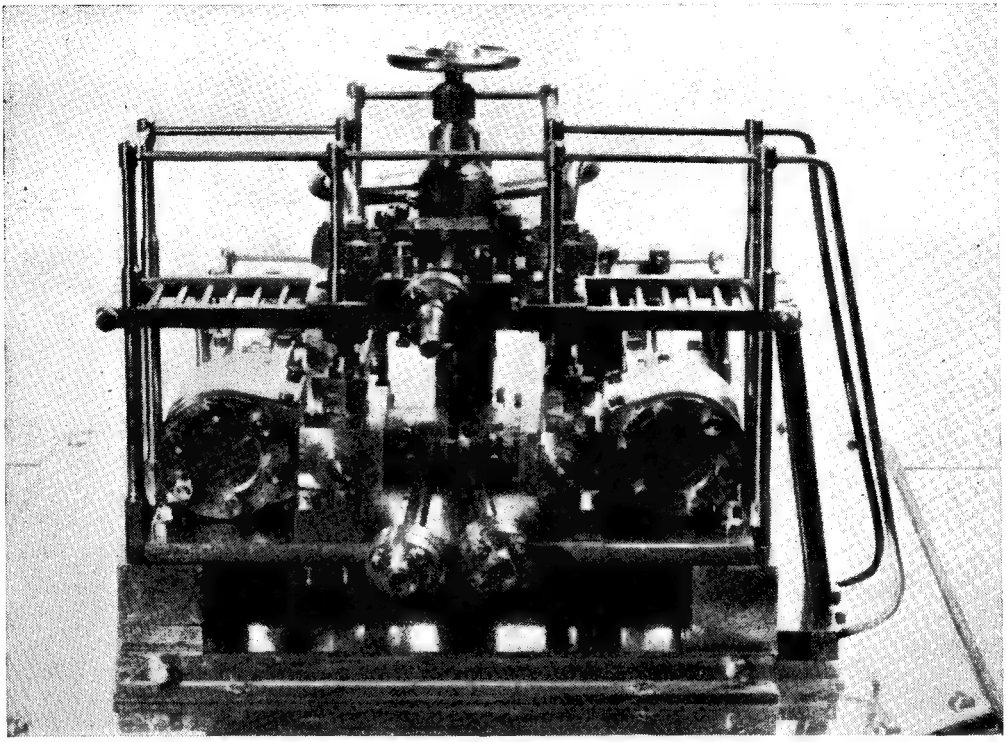
At present, the engine has only been under air pressure and works very well, although at high speed there is some vibration, due, I think, to the balance weight on the flywheel.

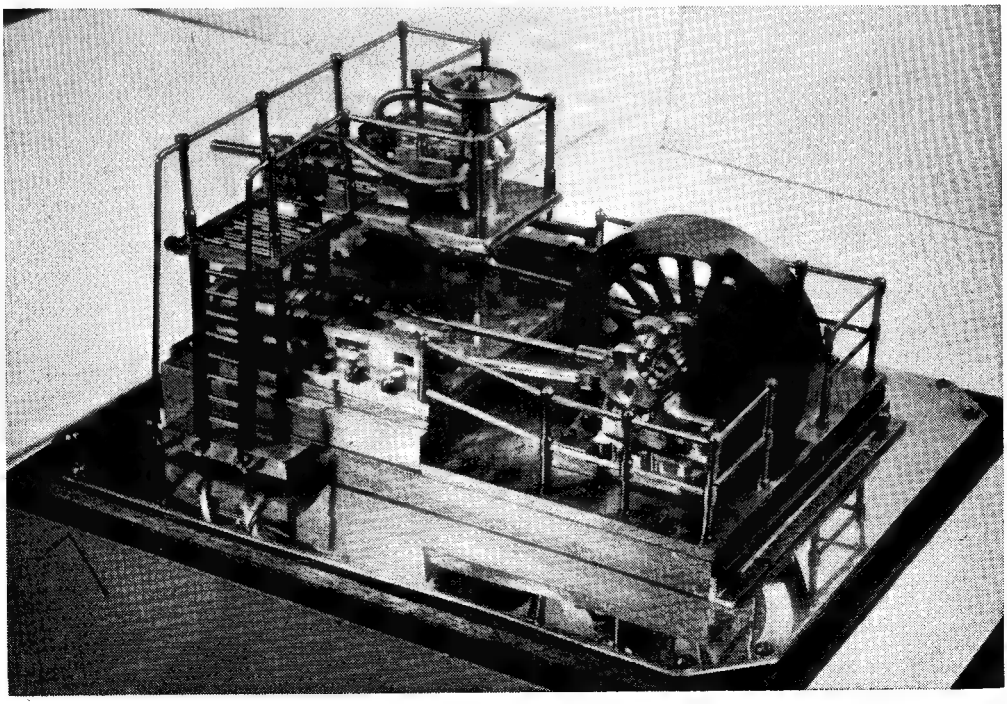
On just a crack of throttle she ticks over very smoothly, and for the time being anyway, the piston valves and valve chests made, alas, through ignorance, from ordinary soft brass rod, have not shown wear or leaks. On completion of a boiler now under construction, I hope soon to have the model under steam.

As before, I had no drawings to work from except for sketches here and there that I made myself. The position of steam ports and the valve travel were worked out by using a small cardboard piston valve and dots drawn on the bench.

I think that one of the most fascinating features of model engineering is trying to design one's own models, even if all does not go well all the time; but any further efforts of mine must go on the drawing board first. "Making it up as one goes along" produces some queer errors in proportion, apart from mechanical ones, as is evident from this model with its massive stanchions and handrails, and doubtless many other faults of which I am in ignorance. A friend of mine remarked "that it was to be hoped that my engineer suffered from cold feet, as his control platform bridges the main steam pipe."

However, with an ever-increasing enthusiasm, I shall march on to what I suppose is the Mecca of all model engineers . . . the production of a real live steam locomotive, when, with drawings, and the "words and music" of "L.B.S.C." to guide me, I shall probably get things somewhere near the place for which they were intended.

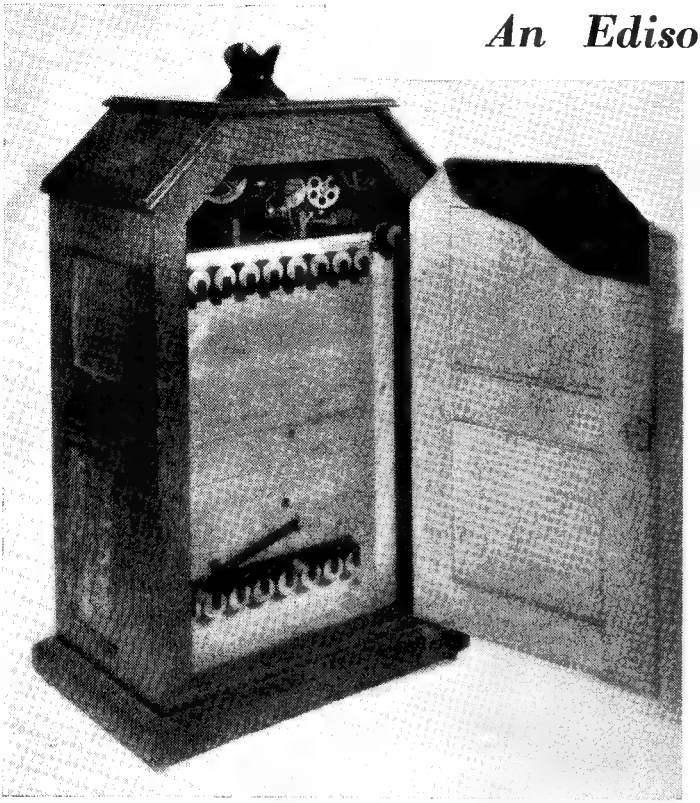




An Edison Kinetoscope

A Further Contribution to Eastman House Collection

by G. G. Corder



The original apparatus shown in the cabinet

THE collection of historical photographic apparatus in the museum in George Eastman's house in Rochester is to include an Edison kinetoscope, and the Kodak Society of Experimental Engineers and Craftsmen has been privileged to assist in bringing this about.

The speed of industrial and technical advance in the United States has made Americans pretty ruthless when a particular phase of an activity is superseded by a more modern development and there is less veneration of old machines for their historical and sentimental attachments.

Accordingly, when the authorities wished to include an original kinetoscope in the collection, a state-wide search had not so far revealed a single machine which could be made available. The need was made known to the K.S.E.E.C., by their good friend, Dr. D. A. Spencer ; the Science Museum was again approached (it will be recalled that, by their courtesy and that of the Royal Photographic Society, the society was permitted to make replica copies of unique Fox Talbot apparatus), and by good fortune the keeper of the photography collections, Mr. Alexander Barclay, had recently acquired a second complete machine and was therefore able to loan the society an original model for copying purposes.

This particular machine probably went out of active use as a fairground peep-show in 1906, when the latest Edwardian beauties and the night life of the early 1900's were shown. Mr. James Henderson, still living in the north of England and his father before him, acted as the equivalent of the modern cinema proprietor and distributor, showing films on batteries of these machines.

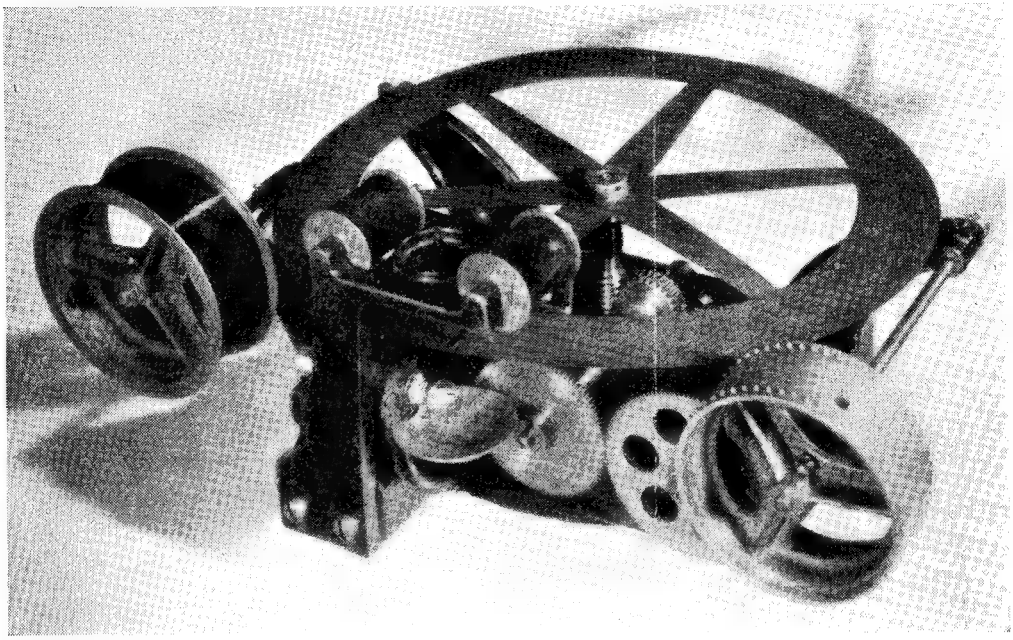
More recently, retired from active business, he has kept this machine—and other early film apparatus—in running order and was always ready to demonstrate them to his friends and talk of the early days of show business. The motive power for the kinetoscope was the original Edison-made open coil 12-volt electric motor which ran perfectly after 50 years !

At Mr. Barclay's request, enquiries have been set on foot in the United States, to ascertain more precisely the date of manufacture of this particular machine of which the registered number is known from the original manufacturer's plate, which states that it was made by The Edison Manufacturing Co. at their works in Orange, New Jersey, N.Y. Unhappily, a disastrous fire destroyed the factory and all the records of this enterprise of Edison's in 1914, but there is a prospect of locating some of the personnel who worked with him.

Another interesting feature is that the sprocket wheel of the machine which progresses the endless band of film through the machine will operate smoothly with modern cine positive stock, Edison's original specification of pitch and size for 35 mm. film settled with George Eastman having been upheld by the industry until the present day.

With great care, prints are being made on modern stock of original kinetoscope films stored in the vaults at Rochester ; they will be capable of projection both on the original machine and also on the replica which the K.S.E.E.C. has produced.

The manufacture of an exact replica mechanism has involved the careful dismantling of the original and the precise measurement of every single



A close-up of the original apparatus

part. Patterns were made in order to reproduce the cast items and similar metals were used for the various sprocket, bevel, and worm wheels. The machining and assembly of the parts formed ■ very nice exercise in engineering craft and under the direction of Mr. George Badger, K.S.E.E.C. committee man, who is also responsible for apprentice training under Mr. K. N. Harris, ■ mixed team of apprentices and society members produced an exact replica. In this instance, no attempt has been made to reproduce the exact appearance of the original ; but the design and dimensions of each part have been faithfully copied and we understand that Eastman House intend to mount the mechanism in ■ special cabinet so that the working parts can be seen. Visitors will operate it by a push-button and so

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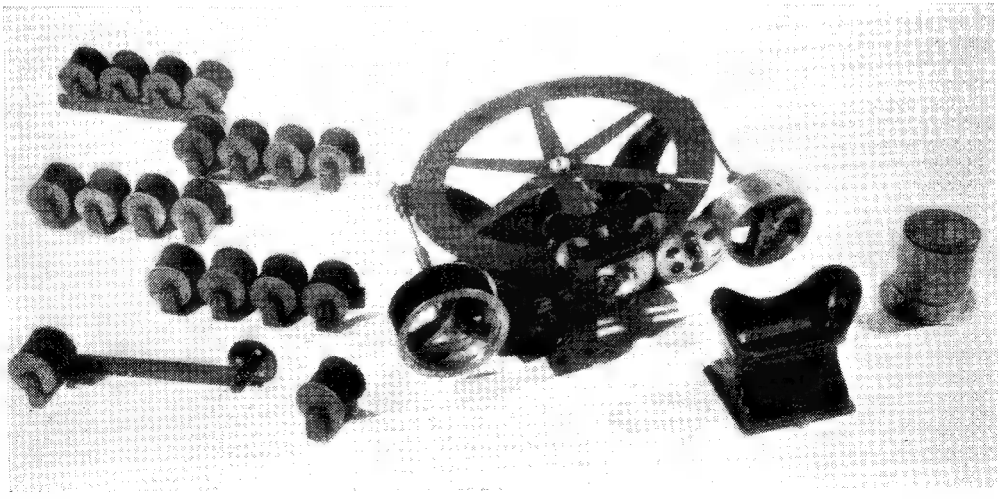


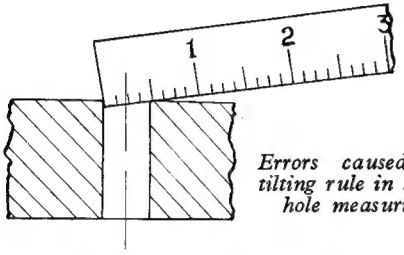
Various parts of the constructed replica before assembly

A Simple Adaptation to a Worn Rule

by W. M. Halliday

As is well known, the ordinary tempered steel rule or scale, used by engineers, after repeated use tends to become worn and rounded on the corners at the square end of the rule, which in extreme cases will render the tool practically useless for taking the measurement of small-size holes, etc. Worn rules of this kind are usually then discarded.

It is easily possible, however, to convert such a rule into quite a serviceable tool, especially to facilitate the measuring of holes of small diameter, shallow recesses and the like, where the diameter or depth has to be measured within close limits.



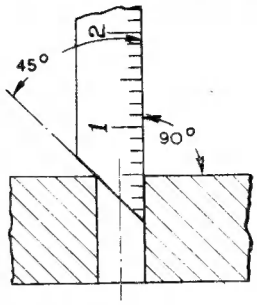
Errors caused by tilting rule in small hole measuring

As will be observed, the worn edge of the rule is ground off at an angle of exactly 45 deg. to the long side in the manner indicated.

When performing this chamfering operation, care will have to be taken not to allow the bevelled edge to pass beyond the extreme corner, otherwise the true size of the first graduation will be diminished.

It will be advisable to perform the grinding operation with the rule mounted rigidly and accurately positioned to the correct angle, by holding it in the universal vice, rather than by off-hand grinding the 45 deg. chamfer and using a protractor as a gauge.

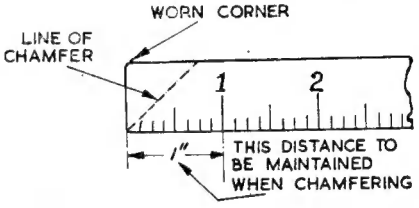
The illustrations also depict the rule modified in this manner, applied to a small diameter hole, to illustrate the method of using. The rule is held vertically to the surface of the work-piece as shown, with the bevelled edge inserted into the hole ; its diameter may then be read off exactly on the graduations at the right-hand side and



Modified rule, with end chamfered at 45 deg., applied to small hole for measuring diameter

which extend to the apex of the chamfered end.

It will also be realised that when using the ordinary square-ended rule for measuring small diameter holes of the above kind, the tool will have to be tilted slightly so as to allow one of the corners to enter the hole and to rest against one



side thereof, after the fashion depicted in the sketch.

Inaccuracies may easily result from this practice.

With the modified form of rule here suggested, however, this undesirable feature of use will be completely eliminated.

The Edison Kinetoscope

(*Continued from previous page*)

see the moving pictures, the presentation of which by Edison laid the foundations of the movie industry and assured, through George Eastman's genius in producing film support on a commercial scale, the future of a very important branch of the Kodak company's activities.

After a short period on view at the factory the parts will be carefully packed and despatched to Rochester and we hope to be able to reproduce in a future issue of the "M.E." a photograph of the complete exhibit installed in Eastman House.

The society is very glad again to have had the opportunity of using its organisation in performing a service for the company from whom so many favours and so much encouragement has been received, and acknowledges gratefully the good offices of Dr. Walter Clark at Rochester, Dr. D. A. Spencer and Mr. Alexander Barclay and the assistance and advice of other members of the Harrow factory.

Screwcutting Trains

for the 4-in. Drummond Lathe

FOR very many years, the round-bed 4-in. lathe manufactured by Messrs. Drummond Bros. Ltd., of Guildford, was one of the most popular among model engineers, and although its production has been discontinued for several years, many thousands of these lathes are still in existence and giving excellent service in home workshops. Many queries are received regarding the supply of spares, also for information on calculating screwcutting trains for this type of lathe, which differs from most modern types in having a 10 t.p.i. leadscrew instead of the more common 8 t.p.i., with change wheels having different numbers of teeth to those usually employed.

In reply to a recent query we referred to the lack of data on this particular matter, and the immediate result was a rush of correspondence from helpful readers who were able to supplement the available information, including a letter from the Myford Engineering Co. Ltd., Beeston, Notts, which we reproduce herewith in the hope that it will furnish the data required by our numerous querists :—

"Your information that this particular lathe is now out of production is correct, but we would like to record that we have taken over from Messrs. Drummond Bros. the manufacturing rights of their small lathes, and any enquiries addressed to Messrs Drummond Bros. concerning either their 4-in. round-bed or 3½-in. flat-bed lathes are now passed to us for attention.

"Referring to the 4-in. round-bed lathes, Messrs. Drummond Bros. manufactured two models, changes in the design of this machine being made in 1919. The earlier pattern had serial numbers preceded by the letter "A" and had detachable bronze bearings bolted to the headstock casting, whereas the later machines had serial numbers prefixed by the letter "O" and the casting of the headstock was built up to form bearings so that the spindle ran direct in the cast-iron of the headstock.

"At the time of the change, the set of change wheels was also altered ; therefore, to advise the standard set of change wheels originally supplied with one of these lathes, it is necessary to know the type. The old type round-bed lathes were supplied with a standard set of 10 change wheels comprising two each 20-teeth, one each 24, 28, 30, 32, 36, 40, 44 and 64-teeth wheels. The later type round bed lathes were supplied with a standard of 11 change wheels comprising two each 20-teeth, and 40-teeth, one each 25, 26, 30, 35, 45, 50 and 66-teeth wheels.

"We are able to supply various replacement parts for the Drummond round-bed lathes, including a complete range of change wheels, fitting either 4-in. or 3½-in. Drummond lathes, as follows : 20, 24, 25, 26, 28, 30, 32, 35, 36, 38, 40, 44, 45, 46, 50, 52, 55, 60, 63, 64, 65, 66, 70, 73, 75, 80, 85, 90, 95, 100-teeth.

"We have no metal screwcutting charts for these machines but we give herewith two charts, which we hope will be found useful.

"From the set of change wheels listed by A.D.C. (Uckfield), it would appear that he has one of the new type round-bed lathes in his possession. If the set-up given in your reply is

Screwcutting Chart

"A" Type 4-in. Round Bed Drummond Lathe, New Type

Threads per Inch	Mandrel	Driven on Stud	Driver on Stud	Lead-screw
5	50	—	—	25
6	50	—	—	30
7	50	—	—	35
8	50	—	—	40
9	50	—	—	45
10	40	—	—	40
11	30	20	40	66
12	25	—	—	30
13	20	—	—	26
14	25	—	—	35
16	25	—	—	40
18	25	—	—	45
20	25	—	—	50
24	25	40	20	30
26	20	26	20	40
28	25	40	20	35
32	25	40	20	40
36	25	40	20	45
40	25	40	20	50

Fine Feeds

Cuts per Inch	Mandrel	Driven on Reverse Stud	Driver on Reverse Stud	Driven on 1st Stud	Driver on 1st Stud	Driven on 2nd Stud	Driver on 2nd Stud	Lead-screw
148.5	20	—	—	45	25	50	20	66
200	20	35	26	45	25	50	20	66

checked, we believe that you will find this gives 148.5 cuts per inch and not 117. In this connection we would remind you that the leadscrew is threaded 10 t.p.i. right-hand, which means that it will be necessary to use an idle wheel on the reverse stud. This fact can be taken advantage of to use a triple compound train which is shown on the chart and gives 200 cuts per inch."

Metric Threads

Pitch mm.	Mandrel	Driven on Stud	Driver on Stud	Lead-screw
0.50	26	40	20	66
0.75	26	40	30	66
1.00	26	—	—	66
1.25	26	40	50	66
1.50	26	20	30	66
1.75	26	20	35	66
2.00	26	20	40	66
2.25	26	20	45	66
2.50	50	20	26	66

On simple trains, e.g. 5, 6, 7 t.p.i., etc., and single compound trains, e.g. 24, 26, 28 t.p.i., etc., use any convenient wheel as idling intermediate to make up space between gears.

In all instances where necessary use idling intermediate on reverse stud to obtain correct direction of feed or thread.

On fine feed 200 cuts per inch reverse stud is used to give triple compound train and only right-hand feed can be obtained.

Change Wheels

Standard Set
Two each 20- and 40-tooth One each 25-, 26-, 30-, 35-, 45-, 50- and 66-tooth

We take this opportunity of thanking the Myford Engineering Co. and also the readers who have written to fill the gap in the information available to us on this matter.

PRACTICAL LETTERS

Stationary Steam Engines

DEAR SIR,—I was very interested in your "Smoke Ring" on the subject of "Stationary Steam Engines" in the June 29th issue, where you put forward a plan in support of authoritative information on old-time stationary steam engines.

I am a lover of all old-time steam machinery, and it grieves me to think that old plant is rapidly dying out, and with it, the beautiful craftsmanship that went into its making.

Some while ago I felt almost guilty in having, so to speak, to drive the nails in the coffin of four lovely Willans central valve engines installed in 1895 and still good for another 50 years.

I am employed in the electricity supply industry, and it became my duty to supervise the installation of modern high-tension apparatus to replace the old engines. They are, however, still in service, as the complete changeover has not yet been completed.

By kind permission of the engineer-in-charge, I was enabled to make a complete set of sketches from one set down for overhaul, and it is my earnest intention to get out a complete set of working drawings with the object of building a true-to-scale (externally, at any rate) model of one of these beautiful machines.

They are the real thing built at Thames Ditton before the works were moved to Rugby, and contain the original working parts. The only alteration made has been the fitting of carbon brushes to the bipolar dynamos to replace the original copper gauze type. They run practically silent except for the characteristic "ticking" noise due to the special piston and valve rings employed.

The building of such a model would no doubt require a lot of accurate work and, of course, certain modifications would have to be made to make it a successful job. However, as time permits, I intend to make the drawings and if possible, my own castings.

Another job that I unfortunately helped to its death was that of a beautiful horizontal mill engine of about 1860, made by Benjamin Hick, of Bolton.

This old fellow was a lovely example of old craftsmanship (I say "was" but it is still in position but now has taken on that "neglected" look), and is a fine "drop-valve" engine, horizontal single-cylinder, the flywheel of which has cottered spokes and is geared via teeth in its rim to the main mill shaft.

The slide-bar surfaces still show the marks of the fitter, and the old-fashioned scrolls and fluted columns are all in evidence. When I last saw it at work about three years ago, the jet condenser still showed 27 in. of vacuum and the old machine ran perfectly.

It is my intention to make the necessary sketches with a view to getting out working drawings of this old fellow, too, but so far, time has been the limiting factor.

All these "antiques" are within a radius of 20 miles from here, and if any readers are genuinely interested and will, with your kind help, get in touch with me, I will try to arrange a visit, or at best, give them the necessary information as to where they are to be seen.

Yours faithfully,

Yeovil. R. L. A. BELL.

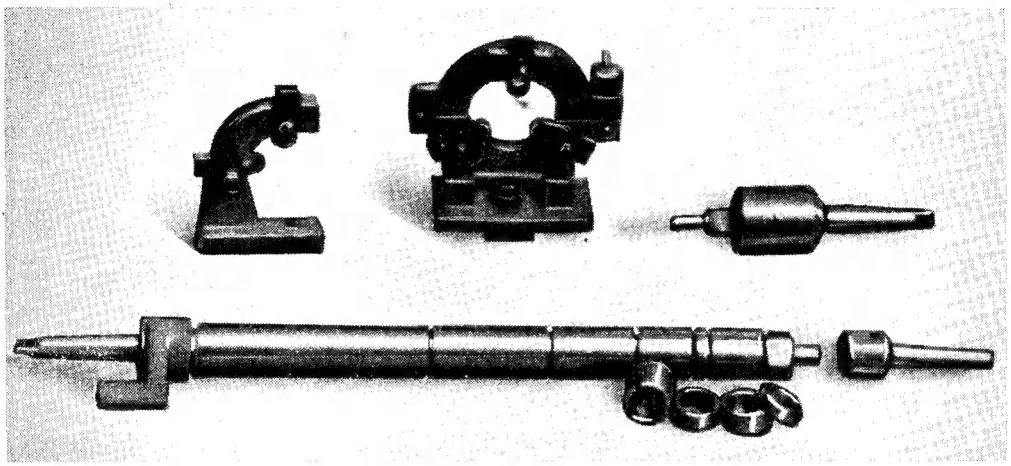
Lathe Attachments

DEAR SIR,—The reproduced photograph shows a milling arbor and a boring head which I have made utilising blank-ended arbors. Also included are a fixed and travelling steady fabricated from

rolled steel section. These were all made for a Myford M.L.7 lathe.

The milling arbor was built to save spoiling a ship for a ha'porth of tar, knowing that I could borrow the slitting saws from a pal of mine to cut the slots in the " Cowell " drill components. It is designed with spigot bearing at the outboard end instead of the usual centre bearing. This reduces the wear and so lengthens its accurate life.

The fixed steady was called into play to cut the



spigot bearing and the threaded end carrying the lock-nut. The base block of the steady was formed from solid on a shaper and milling machine in the machine shop of the local Evening Institute. The travelling steady also came in useful for cutting the quill for the above mentioned drill.

The boring head has the tool adjusted by means of two long Allen screws locking the swivelling tool holder.

My advice to beginners wishing to learn machining and bench work is to take a course at the local Technical Institute when the courses start next September. The written word is always much easier to understand after an explanation.

Yours faithfully,
A. E. CLAUSON
East Ham. (A.M.Inst.Mech.E. Grad.I.E.D.)

Thermal Insulation

DEAR SIR,—The method given on page 7 of THE MODEL ENGINEER of July 6th, for protecting an electric cable against heat and mechanical damage may give good mechanical protection, but it is of no use against damage by heat. However well a body is thermally insulated, it will eventually take up the temperature of the surroundings, e.g., the hot water in a vacuum flask goes cold in time. In the same, a cable wrapped with asbestos will take up the temperature of the surrounding air.

When carrying current, a cable has heat generated in the copper conductors and this heat can be dissipated only by conduction to the outside of the cable, and when an asbestos wrap is interposed the internal temperature will become higher than it would be without the wrap.

The only cases where the suggested method would be of use are where the length exposed to heat is very short, say a few inches, or where the high temperature occurs for a few minutes at a time, but neither of these apply to the example given in the article. For such a case, the only effective methods are those aimed to reduce the ambient temperature in which the cable operates.

Yours faithfully,
Liverpool. H. S. CHIRNSIDE.

Model Outboards

DEAR SIR,—May I thank Mr. D. A. Jules (" Practical Letters," July 20th issue) for his valuable offer of help in the cause of the model outboard.

I suggested a capacity limit of 2.5 c.c., as in my opinion it is quite large enough, even for a twin, but I am, of course, quite prepared to bow to the majority on this point.

Perhaps we could have a few more opinions on this question.

I used a 1 : 1 ratio on my engine, as it was the only pair of small bevels obtainable at the time ; also, to use, say, $1\frac{3}{4}$: 1 would require a larger underwater housing, and mine is already too large (using gears of about $\frac{7}{16}$ in. o.d.) and needs a very large propeller boss to match it.

A few notes and, if possible, drawings of full-size outboard hulls from Mr. Jules would be very welcome, as also would be details of the 5 c.c. unit he mentions in his letter.

If Mr. Jules would care to drop me a line c/o the Editor, we might possibly do some groundwork in the cause, and if we can obtain the help of a few more interested readers—who knows ?—there might be a meeting of such boats in the not to distant future.

Yours faithfully,
Bickley. G. O. CAIRD.